AmericaView: A National Remote Sensing Consortium

Grant Award Number 08HQGR0157

DRAFT

Annual Progress Report for Grant Year FY2010

Work completed from September 30, 2010 through June 30, 2011 (with an extension through December 31, 2011)

Submitted to the

USGS Project Officer and Grant Administrator
AmericaView Consortium Board of Directors

Prepared by Rick Landenberger, AV Executive Director and Debbie Deagen, AV Program Manager

March 4, 2012

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1. EXECUTIVE SUMMARY

AmericaView is a nationally organized consortium of state-based partners whose mission involves promoting and supporting civilian remote sensing. Aligned closely with the US Geological Survey's Land Remote Sensing Program, the AmericaView network promotes and supports remote sensing outreach, education, applied research, and data access activities that occur at the state level, largely but not exclusively through StateView consortium partnerships. Partnerships and associated networks are essential because they effectively leverage funding and expertise, increasing efficiency and advancing the utility of remote sensing as a tool to support a wide range of societal benefits aligned with the USGS Land Remote Sensing mission.

As reported in the pages that follow, the AmericaView Consortium has had a successful grant year 2010, the fourth in our five year grant (USGS 08HQGR0157). In conjunction with a new AmericaView web site and added functionality of the consortium's online reporting tool to facilitate sharing of ideas, grant year FY2010 (GY 2010) has seen increased programmatic and state-level efficiency through increased leveraging of the collective knowledge and experience of our consortium members and their partners. In the ongoing era of extremely limited funding per StateView consortium and national part-time staff support, our increased efficiency has allowed us to continue to ***advance the availability and widespread use of remote sensing data and technology through education, research, outreach, and sustainable technology transfer to the public and private sectors*** *(AmericaView Charter, 2002)*.

In GY 2010, the AmericaView (AV) Consortium's core mission remains largely unchanged. Now comprised of **39** members, the consortium is engaged in remote sensing education and applied research in a wide range of natural resource disciplines, including forest, range, and wildlife management, in land use – land cover monitoring, in surface water resources, drought monitoring, and related agricultural assessment, in coastal zone management, and in natural hazard and risk assessment. In combination, AmericaView brings both a diversity and depth of remote sensing expertise to bear on critically important contemporary issues and challenges primarily associated with natural resource management and remote sensing education and outreach through the 382 projects completed in grant year 2010. At a time when the federal government is advancing the nation's land imaging goals, AmericaView is actively *supporting* and *extending* the use of remotely sensed data at the local, state, regional, and national levels, leveraging previous federal investments to maximize the many important uses of public domain imagery and derived products.

Through our increasingly diverse range of highly leveraged projects in outreach, education, applied research, and data access, AmericaView continues to maintain its focus on growing the number and diversity of technology-proficient students, professional technicians and analysts, and academic scientists prepared to apply geospatial technology to the wide range of current challenges and opportunities (Figure 1).

Figure 1. K-12 students from Ohio present their SATELLITES research projects at the AmericaView Fall Technical Meeting in Cleveland, October, 2011. Twenty students attended the meeting, many contributing posters.

Consortium Development and Outreach Activities

New Members

Two new Affiliate members, OregonView and Rhode IslandView, joined AmericaView in grant year 2010, strengthening the consortium through increased diversification of talent and experience. Primarily, OregonView brings added depth in forest-based remote sensing, and Rhode IslandView brings extensive expertise in coastal zone assessment. Along with our two new Affiliates, two former Affiliate members, New YorkView and VermontView, advanced to Associate status, and now the full set of rights of or full members with the except of annual funding. Nonetheless, our unfunded members contribute to, and benefit from the consortium in numerous ways and are funded to attend the annual meetings through travel mini-grants.

Consortium Outreach – the Power of Networking

Aligned with continuing growth of the national organization, StateView consortium development and outreach activities *comprise a broad set of projects* that occur both formally and informally, often as a component of related projects that involve communicating, demonstrating, and applying remote sensing technology. Both the national and state programs continue to connect with and take thorough advantage of their networks to strengthen and reinforce partnering, to communicate current remote sensing and related geospatial science and technology events and activities, and to share ideas that support future collaboration.

During the reporting period, for example, StateViews offered **25** presentations to local, state, and federal agencies and other organizations, sharing information and otherwise supporting remote sensing applications through proactive development or as opportunities arose in partnering organizations (Figure 2). These meetings continuously reinforce and diversify the educational, applied research, and data archiving and distribution capabilities of the StateViews, their partners, and the national program. Similarly, **12** StateView personnel participated in state-level geospatial committees, bringing them up-to-date on activities occurring in neighboring states and at the national level.

Figure 2. Dr. Jason Tullis, ArkansasView PI, is presenting "Planetary Remote Sensing" at a public workshop to celebrate the 10th anniversary of the Arkansas Center for Space and Planetary Sciences, Fayetteville, AR.

In more formal settings, Principle Investigators (PIs, aka 'Directors'), Coordinators, and students provided **20** presentations of their StateView programs at state, regional, and national conferences, including ASPRS where an AmericaView session was held.

Presentations primarily emphasized StateView activities while providing general information on AmericaView goals and objectives. Many of the state conferences involved undergraduate student research funded in part by AmericaView through scholarships and mini-grants, thus helping StateViews to meet related outreach, education, and research objectives at the state level, while simultaneously supporting the development of the future workforce.

> *I wanted to thank Virginia View for to opportunity to present my research at the AmericaView Fall Technical Meeting. I got a lot of feedback on my project on land use change, as well as*

some suggestions on making my research more accurate. I met some very interesting people and am actually thinking about pursuing a Masters in Geography after talking to some of the professionals about opportunities in this field.

West Virginia Wesleyan College undergraduate

Furthermore, presentations at national conferences tended to involve StateView-sponsored graduate student research, or research accomplished by the PIs and their graduate students. In both cases, benefits accrued to the StateView PI, their students, and the larger and more diverse national geospatial community in attendance, supporting the critically important task of developing the future US work force.

Outreach is also accomplished by other mechanisms, many of which overlap with research and educational activities. For example, StateViews supported **five** internships, **five** faculty training projects, **five** software license sharing activities, and **five** collaborative research projects, all of which support either the current or future workforce. Related collaborative projects such as recruiting new partners continue. Despite limited funding, these activities persist at roughly the same level relative to the previous reporting period.

Thank you, IdahoView, for supporting a graduate student [intern] at our school. The McCall Outdoor Science School graduate student [intern] will assist me in preparing, organizing, and teaching a geospatial summer camp for K-12 students… and a curriculum for a geospatial field module that could be taught during 3-5 day residential programs for 5th and 6th graders.

Dr. Jan Eitel
University of Idaho
Director, McCall Outdoor Science School

K-12 Outreach

Outreach activities with kindergarten through 12th grade (K-12) and informal education partners provide another effective mechanism to support the AmericaView mission, and AmericaView continued to make significant strides in GY 2010. Indeed, despite the time, effort, and resources associated with providing quality professional development (Figure 3) and the required follow-up necessary to sustain implementation of geospatial science and technology, K-12 and informal educational outreach continues to grow. This is particularly true in states that have had a historical presence in formal and informal education, when funding levels were higher.

Figure 3. K-12 teachers from Montana attending a geospatial science and technology professional development workshop.

To advance AmericaView's K-12 STEM (Science, Technology, Engineering, and Math) outreach and education mission, the Executive Director developed and submitted a three-year, $1.5 MM NOAA Climate Literacy proposal using time from his faculty position. Called NOAA SATELLITES and organized around the themes of elementary climate science literacy and spatial thinking for 2nd – 5th graders, the proposal included **eleven** StateViews and AmericaView staff in various capacities. Although not funded (funding for the entire NOAA Climate Literacy Program were eliminated by Congress), the project produced several good ideas for reaching and engaging elementary students in

remote sensing and the geographic approach to scientific thinking, elements of which can be used in future K-6 outreach and education projects.

Figure 4. President Obama speaking about the importance of STEM education at the White House Science Fair. A SATELLITES student scientist was invited to attend, and had the opportunity to meet the president and several other top administration scientists and advisors.

Other AmericaView outreach associated with SATELLITES continues to be far-reaching, garnering attention across the country and at the highest levels of government through the project's and AmericaView's partnership with GLOBE. GY 2010 saw several Ohio and West Virginia students and teachers participating in the White House Science Fair, noted on a White House press release which subsequently garnering national recognition.

Finally, the national program staff and Board of Directors performed consortium development and outreach in a variety of venues during GY 2010, including the aforementioned ASPRS session. In addition to formal presentations, the staff and Board organize, coordinate, and otherwise support both state level and multi-state projects such as the AmericaView Multi-State Server (AVMSS), support for three GY 2010 mini-grants, and contributions to the educational resources sharing project on our web site. The staff also routinely posts to the AmericaView Blog, and communicates to the membership during monthly teleconferences and annual meetings. Although technically informal, these activities are critically important and help strengthen the organization's education and outreach mission. For example, the blog received over 300 page views in the last quarter of GY 2010 alone (March through June 2011), resulting in increased awareness of or mission and activities.

Data Archive and Distribution Activities

Due to the USGS full implementation making all Landsat data freely available to the public, many StateViews have been relieved of their responsibility to provide free Landsat data within their states. Yet, driven by ongoing state-specific needs, **25** StateViews continued to address unique archive-related opportunities in education, outreach, training, and applied research through ongoing maintenance of their data archive and distribution systems. **Thirteen of the 25** states host data for partners, and **six** track data downloads, providing an estimate of the breadth of data applications in their states. Perhaps more importantly, **six** StateViews generate user-friendly formats to accommodate the widest range of users, including K-12 teachers that either do not have access to or knowledge of the software necessary to utilize multi-band files. Thus archive maintenance and growth activities continue, building on the momentum of previous years by offering an increasingly diverse set of public domain data.

After years of maintenance, only **two** StateViews grew their archives, adding Landsat, ASTER, MODIS, and various aerial datasets including LiDAR (see testimonial below), while **eight** StateViews strengthened their outreach and research programs through various data sharing arrangements. **Five** StateViews continue to be involved in activities that leverage other projects to purchase data for their archives, and **six** collect and serve free imagery from existing internet sources.

I am writing to thank you for continuing to support the statewide LiDAR web-portal. This site has been a valuable resource for the DNR and other users across the state for several years now. In particular, the engineering community has benefitted from the site and data you offer.

Chris Ensminger
GIS Section , Iowa Dept. of Natural Resources

Four StateViews received, processed, and distributed satellite imagery, and **two** were involved in near real-time collection and distribution of data in collaboration with emergency responders and field operations. MODIS and Landsat imagery predominate, but other data continue to become more widely available as partner-operated reception and processing infrastructure are increasing in demand. These important activities support state and federal agencies in fire management and other natural disasters such as flooding and hurricanes.

Finally, following on the success of the ChesapeakeView multi-state online data service project, GY 2010 saw the development of the AmericaView Multi-State Server (AVMSS). A cooperative project involving **nine** StateViews, the AVMSS will serve a range of public domain imagery following final testing by TexasView in grant year 2011.

Education Activities

AmericaView's educational activities have always been and continue to be central to the organization's mission, and all funded StateViews continue to support education activities of various types, including K-12, higher education, and professional development.

Figure 5. Pre-service teachers at Grafton High School in West Virginia attended a training workshop in the GLOBE Land Cover protocols to support land use mapping around their school.

In part due to continuing efforts of the Education Committee, K-12 activities are a strength involving **24** projects during the reporting period, reaching **250** teachers and **856** students across the consortium, including **76** minority students. In K-12 classrooms, for example, **four** StateViews prepared and delivered remote sensing lectures and demonstrations (Figure 5), and **three** developed remote sensing lesson plans for their own as well as to share with other StateViews.

Earth Observation Day

Earth Observation Day occurred in GY 2010 in early April, with **fourteen** states participating. **Forty-two** K-12 in-service and **twenty-six** pre-service teachers participated, a very conservative estimate. Along with the teachers, at least **1,494** students took part in the event, with **491** attending in California alone. Although the vast majority of students were in the K-12 classroom (Figure 5), approximately **100** were in higher education. Students were supported by a range of lessons updated for 2011, utilizing MultiSpec, Google Earth, and ArcExplorer Online, all freely available and accompanied by tutorials

Figure 5. AmericaView Executive Director Dr. Rick Landenberger visits an elementary school in Morgantown, WV, to introduce 5th grade students to mapping science during Earth Observation Day.

developed and made easily available online by AmericaView PIs.

Outside the classroom, **six** states provided training workshops for teachers during the summer, doubling the number of states involved in this important activity compared to the previous reporting period (Figure 6). **One** StateView provided pre-service training in geospatial science and technology to education majors, and **one** organized and offered activities for the Boy Scouts. These activities range from single presentations offered at teacher science and technology education conferences to week-long intensive professional development opportunities and follow-up field campaigns aimed at coordinating the collection of field data to support scientific research, such as occurs in the SATELLITES program. All such activities focus on using remote sensing as a tool to support STEM education, an increasingly important emphasis in K-12 education due to the interdisciplinary nature of geospatial technology.

Depending on the specific type and duration of the training involved, these activities may require a significant commitment of funds. Considering the importance on follow-up support for teachers, projects tend to require supplemental funding from external sources in order to be fully successful.

Figure 6. MontanaView partner Van Shelhamer provides a Cub Scout troop with training in the use of GPS at an informal educational workshop in Libby, MT. The training included an introduction to remote sensing technology and the AmericaView consortium.

In higher education, **two** StateViews shared software licenses, **eight** shared course materials, and **ten** encouraged the use of their data archives in course and lab exercises. **Eight** StateViews offered applied training for students in government agencies, *a four hundred percent increase over the previous grant year*, while **three** StateViews funded stipends to encourage students to pursue careers in remote sensing.

Finally, training for the current workforce continued, offering excellent opportunities for StateViews to strengthen their partnerships and add new partners. **Eight** StateViews were involved in short courses for local, state, and federal government agencies, either as stand-alone training or tied to a state or regional conference or meeting. One important aspect of professional development and training that is often lacking in other venues, but a recognized strength of StateView training, involves follow-up support after the training is completed. Because of their academic positions, StateView PI's and coordinators are generally available to answer questions, provide feedback, and otherwise provide follow-up support to those that they've already trained. The willingness to sustain contact with participants results in added effectiveness, and strengthens the partnerships that are the basis of successful professional development and training.

Included in the coursework and related data that PI's offer, **four** StateView PI's and coordinators offer lectures on remote sensing technology and applications to non-remote sensing and non-natural resources management personnel, expanding the potential uses of remote sensing across disciplines. In the K-12 environment, **four** StateViews offered lectures to science teachers to support use of geospatial science and technology in elementary, middle, and high school, **six** developed educational workshops during the school year, and **six** provided training for teachers during the summer. **Seven** states continued to offer web-based remote sensing tutorials, FAQs, and related instructional manuals.

The **twenty-five** StateViews that maintain an archive continue to encourage and enable the use of their data for teaching purposes. Students at the PI's institution and at partner institutions access imagery from StateView archives regularly as part of remote sensing courses taught by consortium member institutions. The data have been used in a wide range of student-developed project applications across the country, focused mostly on natural resources management issues such as forest and range management, agricultural productivity assessment, drought monitoring, land use – land cover change analysis, and coastal zone monitoring.

Online education is growing in popularity for a variety of reasons, including the increasing cost of traditional education, more flexible time requirements, and the fact that it can be done anywhere that has an internet connection. AmericaView is responding with the multi-state sponsored 'AmericaView University' web-based project, offering a model for multi-state, collaborative online education. Currently offering 16 modules, the resource has the potential to include new content if funding were available or could be diverted from other projects.

In direct support of higher education students in GY 2010, **three** StateViews were involved in activities that fund stipends and scholarships to pursue remote sensing components of their education. Grants were given to students to enhance their research by providing field or other supplies (Figure 7, press release at right), as well as travel grants to present their research at professional meetings.

UND grad students win scholarships

Four UND graduate students will receive scholarships for the current school year as they work to complete their training in remote sensing and geospatial technologies.

Each student will receive a $500 scholarship, awarded through the UND Department of Geography by NorthDakotaView, an organization dedicated to promoting the technology in the state.

The four master's degree candidates are Nels Anderson, Wautoma, Wis.; Annmarie Krmpotich, Sartell, Minn.; Jeremy Smith, Draper, Utah; and Dustin Van Thuyne, Mankato, Minn.

Figure 7. University of North Dakota press release describing North DakotaView student scholarships.

In addition, **nineteen** students received support for professional development, in joining a professional remote sensing organization and to start a student remote sensing club, partly supported by the Potomac Region of the American Society of Photogrammetry and Remote Sensing.

Applied Research

Like education projects, research projects can be expensive and time consuming relative to available support, and projects that depend *solely* on AmericaView funding are essentially non-existent due to their cost. Thus, *partnership-based research activities* predominate, and tend to emphasize supporting the goals of academic, government agency, and NGO partners. **Nine** StateView collaborate with agency partners or private industry to assess the utility of remote sensing for monitoring and mapping activities. **Four** StateViews have designed or otherwise contributed to pilot projects that develop new or innovative applications for remotely sensed data. Innovate and unique applications continue to be the primary focus and are closely aligned with the AmericaView mission. Natural resource management activities that utilize moderate resolution data dominate research activities, but an increasing number of states are involved with partners in natural disaster projects that have an applied emphasis. Additionally, several StateView PIs contribute to sensor design research.

Leveraging their experience and knowledge of remote sensing software engineering, **five** StateViews are involved in activities that develop software to support distribution of satellite, airborne, and geospatial data, effectively linking research with the AmericaView data archive and distribution mission. **Seven** PIs collaborate with other StateView scientists, and **three** post methodologies or tools for use by other StateView members.

I have used MultiSpec for several years, and have gotten a great deal of utility from your software. I greatly appreciate the intuitive nature of MultiSpec, and excellent documentation. Most recently I have used MultiSpec to produce Landsat images for flooding on the Missouri River...used in meetings with FEMA and the Corps of Engineers.

Michael Hove
Senior Water Resource Manager
North Dakota Water Commission

Research opportunities for students continued, either through student mini-grants (as described previously) or through support of the PI via leveraged projects with partners. **Four** StateViews offered scholarships for women and minorities. In addition, **seven** PI's supported graduate student use of StateView data in classroom research projects, and **seven** supported student publications or presentation in university forums. **Eight** StateView faculty served on M.S. and Ph.D. committees, often taking advantage of the research opportunities that arise from membership in the state consortia via internships and summer employment in natural resources management agencies.

Closing Observations

On September 21st, 1966, the United States committed to launch a civilian Earth Resources Technology Satellite, later to become the Landsat series. With this commitment, the Earth observations community prepared to use satellite-based remote sensed imagery in service to society. As the United States enters the fifth decade of applied remote sensing, the AmericaView Consortium, as a grantee of the U.S. Geological Survey Land Remote Sensing Program, is committed to strengthening, diversifying, and expanding remote sensing education and applied research with local, state, and national partners. Working at the K-12, undergraduate and graduate levels, AmericaView and its partners continue to prepare students, train faculty, industry, and government professionals in applied remote sensing, thus raising awareness of the utility of moderate resolution remote sensing while simultaneously addressing timely natural resource issues at state and local levels.

As a direct result of the U.S. Geological Survey's decision to accept an internally non-competitive consortium funding model, AmericaView continues to be a cooperative, effective, and growing network. Cooperation fosters and enables sharing of resources, encourages growth and diversity, and recognizes the increasingly complex challenges of meeting state needs with limited funding. With the current emphasis on education and applied research in partnership with governmental, educational, and non-profit organizations supported by StateViews within each state, and given the realities associated with severely limited funding, AmericaView continues to capitalize on the knowledge and flexibility of the StateViews to meet local, state, and regional needs, and to embark on a new, exciting, and increasingly challenging program of state, regional, and national-scale remote sensing education and applied research.

2. AMERICAVIEW CONSORTIUM LEADERSHIP AND MEMBERSHIP

The AmericaView Consortium consists of a part-time Executive Director (70% FTE), a part-time Program Manager (75% FTE), a seven-member Board of Directors, and PI's at academic lead institutions in each participating state. The Executive Director and Program Manager administer the program on a daily basis, and answer directly to the Board of Directors in all matters. Both the Executive Director and Program Manager are employees of their respective Universities; AmericaView has no employees.

The AV Board met monthly via teleconference or in person to provide consortium leadership. In GY 2010, the AV Board of Directors devoted more than 535 hours in Board service to AmericaView.

Board of Directors

Dr. Ramesh Sivanpillai
Chair, University of Wyoming

Ms. Milda Vaitkus
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Dr. James Campbell
Virginia Tech

Dr. Rick Lawrence
Montana State University

Mr. Jarlath O'Neil-Dunne
University of Vermont

Advisor

Dr. Rebecca L. Dodge
Midwestern State University

Staff

Dr. Rick Landenberger, Executive Director
University of West Virginia

Ms. Debbie Deagen, Program Manager
Montana State University

StateView Membership

As of June 30, 2011, AmericaView had 39 StateView members: 31 Full Members, three Associate Members and five Affiliate Members. AV's current StateView members are:

Full (funded) Members for FY10 grant

AlaskaView
http://www.gina.alaska.edu/projects/alaskaview
Mr. Tom Heinrichs
Geographic Information Network of Alaska
University of Alaska Fairbanks

AlabamaView
http://www.alabamaview.org/
Dr. Luke Marzen
Department of Geography
Auburn University

ArkansasView
http://www.cast.uark.edu/cast/arkansas_view
Dr. Jason Tullis
Center for Advanced Spatial Technologies (CAST)
University of Arkansas

Mr. Bruce Gorham
Center for Advanced Spatial Technologies (CAST)
University of Arkansas

CaliforniaView
Dr. Susan Ustin
Center for Spatial Technologies and Remote Sensing (**CSTARS**)
University of California at Davis

Pia van Benthem
Outreach Program Coordinator
Department of Land, Air and Water Resources
University of California at Davis

ColoradoView
http://coloradoview.org/
Dr. Wei Gao
USDA UV-B Monitoring and Research Program
Colorado State University

Roger Tree
USDA UV-B Monitoring and Research Program
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GeorgiaView
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Dr. J.C. Seong
Department of Geosciences University of West Georgia

Dr. Mark Patterson
Geographic Information Science Service Center
Kennesaw State University

HawaiiView
http://hawaiiview.higp.hawaii.edu/
Dr. Robert Wright
University of Hawaii
School of Ocean and Earth Science and Technology

IdahoView
http://www.idahoview.org/
Dr. Temuulen (Teki) Sankey
Research Assistant Professor, Department of Geosciences
Idaho State University

Dr. Nancy Glenn
Director of the Boise Center Aerospace Laboratory
Department of Geosciences
Idaho State University

IndianaView
http://www.indianaview.org/
Mr. Larry Biehl
Purdue Terrestrial Observatory,
Purdue University

IowaView
http://www.iowaview.org/
Dr. Ramanathan Sugumaran
Department of Geography
University of Northern Iowa

KansasView
http://www.ksview.org/
Dr. Steve Egbert
Kansas Applied Remote Sensing Program (**KARS**)
University of Kansas

Kevin Dobbs
Kansas Applied Remote Sensing Program (**KARS**)
University of Kansas

KentuckyView
http://www.kentuckyview.org/
Dr. Christine McMichael
Inst. for Regional Analysis and Public Policy
Morehead State University

LouisianaView
http://www.rac.louisiana.edu/
Mr. Brent Yantis
Regional Application Center
University of Louisiana

MarylandView
http://marylandview.towson.edu//
Dr. John (Jay) Morgan
Dept. of Geography and Environmental Planning
Towson University

MichiganView
http://wiki.americaview.org/display/miview/Home
Dr. Nancy French
Michigan Tech Research Institute (MTRI)
Michigan Technological University

MinnesotaView
http://minnesotaview.gis.umn.edu/
Dr. Marvin Bauer
Department of Forest Resources
University of Minnesota

Dr. Joseph Knight
Department of Forest Resources
University of Minnesota

MississippiView
http://www.msview.olemiss.edu/
Dr. Greg Easson
Enterprise for Innovative Geospatial Solutions
University of Mississippi

Mr. Hal Robinson
Geoinformatics Center
University of Mississippi

MontanaView
http://www.montanaview.org/
Dr. Rick Lawrence
Land Resources/Environmental Science Dept.
Montana State University

Ms. Christine M. Sommers-Austin
Land Resources/Environmental Science Dept.
Montana State University

NebraskaView
http://nebraskaview.unl.edu/
Dr. James Merchant
Center for Advanced Land Management
Information Technologies (**CALMIT**)
University of Nebraska-Lincoln

Ms. Milda Vaitkus
Center for Advanced Land Management
Information Technologies (**CALMIT**)
University of Nebraska-Lincoln

New Hampshire View
http://www.nhview.unh.edu/
Dr. Russ Congalton
Department of Natural Resources and the Environment
University of New Hampshire

New Mexico View
Scott Schrader (Interim Principal Investigator)
USDA ARS, Jornada Experimental Range
Las Cruces, NM

North Carolina View
http://www.ecu.edu/cs-cas/geog/ncview/
Dr. Yong Wang
Department of Geography
East Carolina University

North Dakota View
http://www.und.nodak.edu/org/ndview/
Dr. Brad Rundquist
Department of Geography
University of North Dakota

OhioView
http://www.ohioview.org/
Dr. Pete Clapham
Cleveland State University

Dr. Jim Lien
State Director

PennsylvaniaView
http://www.paview.psu.edu/
Dr. Tom Mueller
California University of Pennsylvania

South Dakota View
http://sdview.sdstate.edu/
Ms. Mary O'Neill

Engineering Resource Center
South Dakota State University

TexasView
http://www.texasview.org/
Dr. P.R. Blackwell
Columbia Regional Geospatial Service Center
Stephen F. Austin University

Dr. Rebecca Dodge
The Department of Geosciences
Midwestern State University

VirginiaView
http://virginiaview.cnre.vt.edu/
Dr. James Campbell
Department of Geography
Virginia Tech

Dr. John McGee
Virginia Geospatial Extension Specialist
Department of Forest Resources and
Environmental Conservation
Virginia Tech

West Virginia View
http://www.wvview.org/
Dr. Tim Warner
Department of Geology and Geography
West Virginia University

WisconsinView
http://www.wisconsinview.org/
Dr. Sam Batzli
Environmental Remote Sensing Center (**ERSC**)
University of Wisconsin

WyomingView
http://www.wygisc.uwyo.edu/wyview/
Dr. Ramesh Sivanpillai
Wyoming Geographic Information Science Center (**WYGISC**)
University of Wyoming

ASSOCIATE MEMBER

UtahView
http://earth.gis.usu.edu/
Dr. Douglas Ramsey
Department of Wildland Resources
Utah State University

AFFILIATE MEMBERS

ConnecticutView
http://ctview.org/
Mr. James Hurd
Center for Land use Education and Research (CLEAR)
University of Connecticut

NevadaView
Mr. Ronald H. Hess (retired)
Nevada Bureau of Mines and Geology
University of Nevada at Reno

New YorkView
http://nyview.esf.edu/
Dr. Jungho Im
Department of Environmental Resources and Forest Engineering
State University of New York

VermontView
http://www.uvm.edu/vermontview/
Mr. Jarlath O'Neil-Dunne
Spatial Analysis Laboratory
University of Vermont

WashingtonView
Dr. Mark Swanson
Department of Natural Resources
Washington State University

3. FINANCIAL SUMMARY FOR GRANT YEAR FY10

Grant funding for FY 2010 was $967,400.00. More than 78% of the grant went directly to support StateView Full Member sub-awards, mini-grants to Full Members, Associates, and Affiliates, and to Associate and Affiliate travel. Sub-Awards for each of the 30 fully funded members for GY 2010 was $25,000.00.

Appendix 2 shows the expenditures by category for the GY 2010 grant. $967,400.00 was expended for GY 2010.

4. HIGHLIGHTS, CHALLENGES, AND OPPORTUNITIES

Highlight: Continued Expansion of the AV Consortium

During GY 2010, two new Affiliates, Oregon and Rhode Island, were welcomed into the AmericaView Consortium; and Vermont and New York were advanced to Associate Member status. Because the effectiveness of the AV Consortium depends on all members, including our unfunded Affiliates and Associates, these additions increased the energy, knowledge base, and collaborative potential of the organization.

Highlight: Third Earth Observation Day

Earth Observation Day (EOD) is a nationally coordinated event that is designed to highlight the use of remote sensing and related geospatial technologies as effective, engaging, and powerful educational tools in both formal K-16 as well as in informal educational environments. In GY 2010, 14 states participated, involving 42 in-service and 26 pre-service teachers and 1,494 students. As a cooperative project involving the USGS and participating StateViews, EOD planning sessions were coordinated through the Education Committee, drawing more members into the committee structure. EOD and Education Committee efforts included initial design of five lessons for K-12 science teachers, a set of three posters for all 50 states available on the EOD web site to support projects, and ideas for implementation.

In GY 2010, the EOD web site had 3,156 unique visits; 2,384 first time visits; and 772 return visits. The visitation by 2,384 first time visitors indicates the effectiveness of this outreach mechanism and the continued interest in this educational activity.

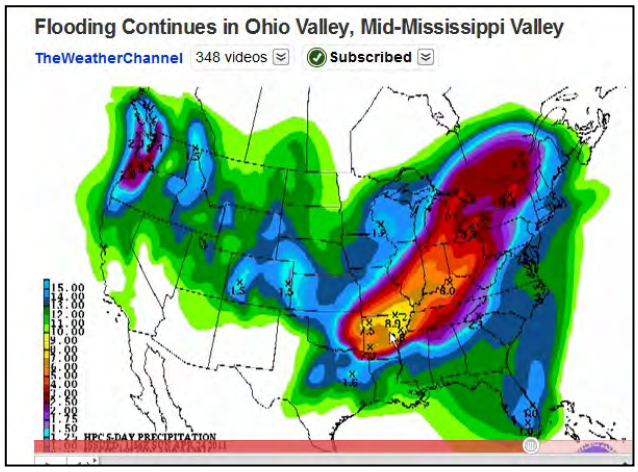
Highlight: AV's assistance with International Charter Calls

Two StateView PIs (Wyoming and Vermont) helped significantly with two International Charter activations in GY 2010 (summer 2011). Although the following two examples involve *volunteer time on the PI's part*, they are included because of the training, general awareness, and network capabilities that have been created within the AmericaView Consortium regarding International Charter activations. The rapid assistance and expertise volunteered by AmericaView members has contributed to lessening loss of life and property in both of these activations.

The importance of involving remote sensing professionals, particularly during the image acquisition phase, was underscored during these two activations. Also important were the many hundreds of hours volunteered for downloading imagery, file format conversion, dealing with naming conventions, coordinate systems, co-registration, and reprojections - these and other related activities require significant critical time during the initial response period. All of these actions are necessary to get the imagery to the point where mapping and other professionals can begin to make many of the useful products that can be extracted from satellite sensor source data.

Dr. Ramesh Sivanpillai (WyomingView PI) served as the International Charter on Emergency and Disaster Response's Project Manager for the 2011 Midwestern Floods. This project started in late April 2011 in Illinois and Missouri and expanded downstream along the Mississippi River to include KY, TN, AR, and LA. For this project, Dr. Sivanpillai coordinated with numerous Federal, State, and local government agency personnel in these states as well as satellite data vendors in Germany, Italy, Canada, and the US. Initially this was projected as 10-day task but was completed three months later in July 201 because of the extensive flooding downriver. This was the second International Charter activation where the AV network was instrumental in

securing the expertise of a remote sensing scientist (Teresa Howard, Center for Space Research, University of Texas at Austin) who was able to analyze radar imagery secured by the Charter.



Members of Oak Glen Residential Community are assisted by rescue personnel as rising waters from a nearby creek forced them to evacuate their homes in Johnson, Ark., on April 25, 2011. Photo by Beth Hall/AP, in Christian Science Monitor.

Vermonters awoke on August 29th, 2011 to some of the worst devastation that the state had experienced in over a century, the result of a direct hit from Hurricane Irene. Heavy flooding in the Waterbury state office complex took the state's key geographic information resources offline at a time when federal, state, and local emergency personnel desperately needed access to the data. VermontView quickly stepped in to coordinate all geographic information activities under the direction of VermontView, PI Jarlath O'Neil-Dunne. By mid-morning on the 29th VermontView had a mirror data download site available that provided FEMA and other federal agencies with access to Vermont's robust set of GIS data. This was the second time when an AmericaView consortium member assisted with replacing the state emergency headquarters, the first being when TexasView assisted with establishing a relief command center in 2008 after Hurricane Ike destroyed the Emergency Operations Center in Galveston County, Texas.

VermontView personnel participated on daily calls to coordinate satellite imagery that was being acquired through the International Charter. Over the course of the week following Irene, VermontView downloaded, processed, and distributed over 300 satellite images to state and local agencies. VermontView coordinated student volunteers at the University of Vermont, producing the first satellite-derived flooding maps for the state. Leveraging the robust IT infrastructure at the University of Vermont, VermontView served as a virtual clearing house for data produced by FEMA and NGA, downloading data to media and transporting it to the temporary Emergency Operations Center (EOC) in Burlington. Once the Vermont Center for Geographic Information (VCGI) had resumed operations, VermontView facilitated an orderly transfer of all data products and worked with VCGI to train state and local personnel on the data products use.

Bennington Police Chief Paul Doucette looks at a collapsed bridge on Route 9 in Woodford, Vt., on Sunday, Aug. 28, 2011. (AP Photo)

Highlight: Winter Business Meeting

Forty-two members and guests attended the AmericaView Winter Business Meeting, held on March 7-8, 2011, in Arlington, VA. This included twenty-nine of the 31 Full Members, one Associate member, and one Affiliate member. Highlights included a day-long visit to USGS Headquarters for updates from USGS personnel. At the end of the Meeting, many states visited their elected officials to update them on the important remote sensing related activities that took place in their state during the year.

Highlight: Fall Technical Meeting

The AmericaView Fall Technical Meeting (FTM) was held on October 10-12, 2011 and was attended by 87 members and guests in Cleveland, Ohio. Hosted by OhioView, the FTM coincided with OhioView's 15th anniversary. Thirty-four presentations were held in conjunction with the Eastern Great Lakes Region of ASPRS.

Highlights included the Honorable Ralph Regula's review of the history and importance of the formation of OhioView and reiteration of the relevance and effectiveness of AmericaView today, focusing particularly on AmericaView's STEM education contributions. Twenty middle and high school students (from four schools) presented their SATELLITES research projects during a poster session. The projects all used geospatial technologies (GPS, GIS and remote sensing) to address an environmental problem. Student projects included study of the earthquake and tsunami in Japan, the best roofing material to use to reduce urban heating, the Earth's energy budget as affected by land cover changes, and the impact of ocean temperature on Cholera outbreaks. These posters illustrated the significant knowledge base that middle and high school students can master regarding remote sensing image analysis and gave the students valuable experience presenting their findings to the attending scientists. For more information (and photos) see: http://blog.americaview.org/ and scroll to the October 15, 2011 entry.

Highlight: Increased Usage of Landsat Imagery for Teaching

The use of Landsat imagery in undergraduate remote sensing courses has increased dramatically since the Landsat archive was opened to the public by the USGS in October 2008. Dr. Ramesh Sivanpillai of WyomingView documented a three-fold increase in imagery usage in his undergraduate remote sensing classes between Fall 2009 and Fall 2011 (See Appendix 4). Free access has allowed his students to conduct multi-temporal image analysis with images

from different seasons and years. Additionally, the students are able to analyze areas of interest such as their family farms or ranches which greatly enhances their motivation and interest in learning.

> "*In using Landsat 5 to look at alfalfa fields, I learned that there are many valuable tools to use to analyze the imagery. You can use these tools to help determine what management practices are working and areas that need more work*."
>
> Undergraduate Rangeland Ecology & Watershed Management student (University of Wyoming, Class of 2011)

Highlight: Development of the AmericaView Multi-state Server (AVMSS)

Nine StateViews pooled financial and intellectual resources to develop and host a web server that serves a "best available" image layer as a WMS and tile service based on technology developed by AlaskaView. The project is now called the AmericaView Multi-State Server (AVMSS). The primary imagery may be from the National Agricultural Imagery Program (NAIP). Individual states will be responsible for providing their data in a format that can be used by the web server to develop various products for AV-wide and specific StateView utilization. The participating states are: Alaska, Texas, Wisconsin, Indiana, Michigan, North Dakota, Virginia, Alabama, and Ohio.

> "*The America Multi-State Server (AVMSS) server project represents more than just another way for AmericaView to serve data. It will provide a mechanism for us to explore new ways to make a difference with remote sensing technology. We need to think beyond what we know to be possible and explore the future. Like REDDnet, the AVMSS can be a test bed for developing future technologies and new, innovative remote sensing applications*."
>
> -- Dr. PR Blackwell, Principal Investigator, TexasView

Accomplishments in GY 2010 include purchase, assembly and testing of the core hardware. The drives were ordered, installed, tested, and configured. Testing of the system in Alaska was cumbersome because of the slow network link. The server was shipped to TexasView to be installed in its long-term hosting location.

Several members from AlaskaView, WisconsinView and TexasView worked to get the infrastructure for this capability set up. It was not completed, however, before the end of the FY2010 grant so that "production" data could be made available. AlaskaView has made great strides in image-based distribution software by creating a simple, web-based, map extraction tool for WMS feeds. Testing of the server continues in anticipation of full accessibility by the membership. The project will be continued into grant year FY11. For more information on this project see D-007 in Appendix 1.

Highlight: New Remote Sensing Course Offering

PennsylvaniaView PI Dr. Thomas Mueller created a new course called *Remote Sensing of the Environment* that is now an official course at California University of Pennsylvania and is also a general education course under Technology Literacy. This course will be the first general remote sensing course taught at the university in eight years. The class will be taught for the

first time in Spring 2012 and has 42 students. While planning the direction of the course, Dr. Mueller sought input from the AmericaView Consortium. To assist, over 20 members sent information about their introductory remote sensing courses.

Highlight: StateViews Offered Valuable Work Experience to Student Employees

Seven StateViews reported hiring 15 students during the past grant year. Projects completed by the students included: developing educational materials for geospatial classes, assisting with preparing for a hurricane response workshop, preparing Landsat and other publicly available imagery for analysis and distribution to the public (including on their StateView websites), collecting field data for validation of land cover and vegetation maps, developing software for analyzing landscape fragmentation, learning new geospatial software, linking oral history collection with geospatial location and displays via Google Earth, and providing real-time satellite ephemeris and sensor imaging geometry data through the web. Through these efforts, students gained valuable work skills and solidified their theoretical understanding. Four of the students were young women, a minority in the geospatial sciences. For more information, see Appendix 5.

Highlight: AV Continued its Work with Native American Tribes and Schools

Five StateViews assisted Native American tribes and schools with developing geospatial literacy and products. KansasView continued assisting the Haskell Indian Nations University's Department of Geography in improving its geospatial education offerings. The Salish Kootenai College joined the MontanaView Consortium. MontanaView PI Rick Lawrence worked with a student from the Three Affiliated Tribes to structure her research project on land use change on the Fort Berthold Reservation in North Dakota. North DakotaView has completed assistance with obtaining and completing a 3-year NSF grant to improve geospatial technology education at Turtle Mountain Community College (TMCC) that serves the Turtle Mountain Chippewa. South DakotaView members worked with three students from Sisseton Wahpeton Tribal College during the summer of 2010 on a lake water quality monitoring project. WyomingView assisted with technology training and transfer at the Wind River Environmental Quality Commission through offering a graduate student scholarship to a Native American and assisting with mapping the surface area of Ocean Lake on the Wind River Reservation. See Appendix 6 for more information and photos.

Sisseton Wahpeton Tribal College Students Working on Lake Monitoring Project during the summer of 2010.

Highlight: Increased Effectiveness of AV Committees

AmericaView continued to see progress in the development of its committees. During GY 2010, the Education Committee, the Outreach Committee, the Technology Committee, and the Research Committee were all strengthened, and now operate effectively to identify, coordinate, and share ideas that support new and innovative state and multi-state programs and projects. It is within these committees that much of the proactive, multi-state projects originates and comes to fruition.

During the grant year, more than 1,591 hours were devoted to committee work by AV members. The Technology Committee coordinated ten StateViews' efforts to plan a collaborative GY 2010 activity: building an imagery web server that will serve multiple states. This collaborative pooling

of skills and hardware funds will allow many states to offer services that they otherwise could not provide.

Highlight: Improvement of AmericaView On-Line Database

Dr. Seong at West Georgia University continued to improve AV's on-line reporting database. This grant year, Dr. Seong added the capability to allow all members to view and search all annual and semi-annual reports and proposed activities. This capability greatly enhances collaborative, multi-state activities.

Highlight: Increased Electronic Distribution of Remote Sensing Materials

With the combined StateView's web sites (see below), along with the AV web site, blog, and Earth Observation site (see above), AmericaView hosted more than 127,000 visitors and more than 244,300 page views during the reporting period. This information greatly enhanced the ability of decision makers, educators, scientists, and the general public to utilize remote sensing data and analytical tools.

Launching of Updated AV web site

AV's updated web site was launched on January 13, 2011. The new site has been upgraded with features such as testimonials on our Program Areas pages (http://www.americaview.org/program-areas), Landsat fact sheets rotating on AV's homepage (http://www.americaview.org/downloadable-fact-sheets), and the first pilot project on resource sharing through posting 18 ERDAS IMAGINE version 10 labs and one eCognition version 8 lab for consortium member's and other educator's use (http://www.americaview.org/remote-sensing-curriculum-and-exercises). Since launch, 2,079 unique visitors have visited the site, totaling 12,719 page views. The site continues to be hosted and upgraded by the Blacksburg Electronic Village at Virginia Tech that utilizes student workers to host the site and draws upon the expertise of Dr. John McGee, the Virginia Geospatial Extension Specialist.

Increased Blog usage

This grant year, AmericaView's Blog site had 1,116 unique visitors for a total of 2,267 page views. There was a significant jump in visitations in March 2011 after Jarlath O'Neil-Dunne posted his VermontView mini-grant video on downloading and manipulating Landsat images in ArcGIS. As of March, 2011, posts to the AmericaView Blog are now automatically cross-posted to Planet Geospatial (planetgs.com) and have resulted in many more visits to the AV Blog site.

Highlight: Continued Data Delivery

The 19 states that maintain web visitation statistics had 115,775 visitors and 218,505 page views. With the opening of the USGS Landsat archive, the majority of the StateViews point their visitors to USGS GloVis or Earth Explorer sites. However, of the states that still archive data, 4,114 GB of new data was archived (by 11 states) adding to a total of 85,560 GB archived (by 18 states). Of the total 26,947GB of remote sensing data that was downloaded, 1,654 GB of Landsat data was downloaded by nine states.

- SV Web visitors: 115,775 visitors (19 states reporting, 2 for partial year)
- SV Web page views: 218,505 page views (17 states reporting)
- Remote sensing data archived: 85,560 GB (18 states reporting)
- Remote sensing data newly added: 4,114 GB (11 states reporting)
- Remote sensing data downloaded: 26,947 GB (10 states reporting)
    - Landsat data downloaded: 1,654 GB (9 states reporting)
    - MODIS data downloaded: 327 GB (4 states reporting)
    - Orthophotos downloaded: 4,492 GB (7 states reporting)
    - Other remote sensing data downloaded: 20,474 GB (7 states reporting)

Highlight: Completion of mini-grants to Affiliates and Full Members

Three mini-grants were awarded in this grant year to Affiliates: **New YorkView** developed a website and an electronic pamphlet to be used for recruiting consortium members, **ConnecticutView** developed a website, developed a list of 11 potential consortium members and began initial outreach and introduced ConnecticutView to 75 attendees at GIS Day in November, 2010. To illustrate the value of its newly formed StateView, **VermontView** developed three short videos focused on accessing and using Landsat data, and accessing and displaying orthophotos. They also developed a Charter for VermontView and added two new members, and established a website.

Three additional mini-grants were awarded in a competitive process open to full members. **IdahoView** completed a mini-grant with the following goals:

1. Develop NDVI image services from Landsat 5 TM imagery for all growing seasons (April 1-September 30) from 1984-2010 for path 39 row 30 (figure 1),
2. Document the image service processing lineage and integrate the documentation into the geospatial metadata,
3. Evaluate the reliability, performance, and acceptability of the image services, and
   Goals 1-3 are described in Lisa technical report 1
4. Document the production of image services using white papers, web pages, and Macromedia flash video (cf. http://giscenter.isu.edu/help/faq_htm/1022.htm for example).
   Goal 4 is met by Lisa Technical Report 2, a white paper / tutorial in the setup and use of the LISA written in an easy-to-follow step-by-step fashion.
   In addition, the LISA project is the featured video on the GIS Center's YouTube page http://www.youtube.com/user/webekeit
   A "time lapse" video of the LISA project can be found at: http://www.youtube.com/watch?v=PTcwH4LqbIc&feature=plcp&context=C42ae40aVDvjVQa1PpcFNp2Z2kA6Iv0ZL_yfbC4ICkoiIJcg4bfGc=

To obtain either LISA technical report, contact AV staff.

South DakotaView educated local transportation-related jurisdiction personnel about the availability and use of remotely sensed data in conjunction with GPS and other geospatial data.

Materials developed include a PowerPoint presentation and a prototype local asset management system that demonstrates the use of GIS as a tool for integrating remote sensing, GPS, map, and tabular data. The materials were made available to all StateViews and the national Local Transportation Assistance Program for distribution and use as appropriate. To obtain the PowerPoint presentation or the map package, contact AV staff.

GeorgiaView created a digital multimedia exhibit entitled *Historic Hall County: Spaces and Places*, that integrates the geography and history of Hall County in northeast Georgia. This was a collaborative project of the Schools of Science, Technology, Engineering and Mathematics (STEM), Social Sciences, and Humanities at Gainesville State College (GSC). A pilot of the website is at: http://web.gsc.edu/gis/hallco/historic/. An article in the local Gainesville, GA Times newspaper is at: http://www.gainesvilletimes.com/archives/53479/.

Area Information

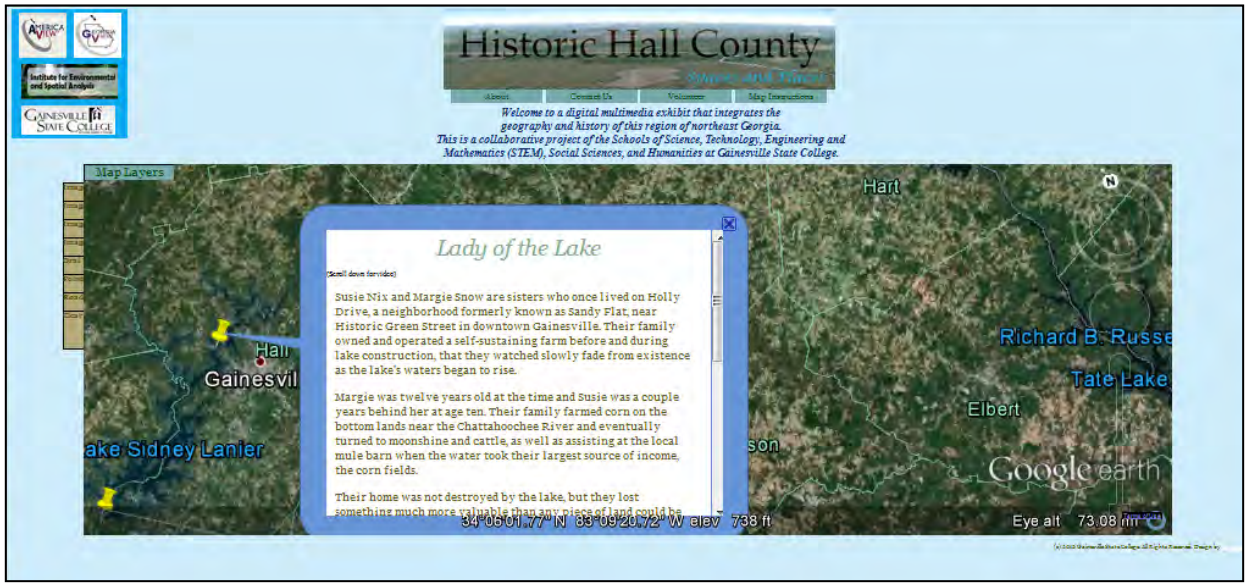
Hall County is located in northeast Georgia, approximately 45 miles from downtown Atlanta. Since 1957, one of the defining features of Hall County has been Lake Lanier, a project of the US Army Corps of Engineers.

History Interviews

Through oral history interviews, GSC students and faculty are preserving the personal histories of the families who were directly affected by lake construction. Using digital photomaps, GSC faculty and students identify specific locations and visually connect personal histories to the changing landscape. Through interactive features, website users can view interviews, as well as photos and essays, related to specific locations.

Spaces and Places Technology

Currently, the site has orthophoto mosaics for 1955, 1957, and 1980. More will be added in the future. These photo maps have a two foot spatial resolution and clearly depict the communities, farms and homesteads in the Chattahoochee River Valley in Hall County in 1955. In 1957 the lake was in the process of being filled and by 1973 had developed



into a source for both water supply and recreation. These photos are a repository of a dramatic land cover and land use change that has removed visible evidence of life in the river valley before the lake was formed. The aim of the project is to recover some of the

memories of life which transpired in the valley's farms with specific spatial reference provided by the historic aerial photos.

Challenge: Budget Cuts

This grant year, the Columbia Regional Geospatial Service Center in Texas was defunded. Loss of this partner was a major loss to TexasView and to AmericaView. Also, defunding of the Upper Midwest Aerospace Consortium (including AV members from ID, MT, WY, and SD) in 2012 will have a detrimental effect on the ability that those StateViews have had to network and synergistically leverage their funds. This weakening of our partner centers and remote sensing consortiums may continue to have an increasingly negative impact on AV's effectiveness and the strength of its network in future years.

Opportunity: Enhanced Communication with USGS

It would be helpful if regular (e.g., every 4-6 months) interactions could be scheduled between USGS employees and contractors, and AV committees in the areas of K-12 Education, Outreach, Technology, and Research. This improved communication might well result in more effective and efficient utilization of AV resources in support of this grant activity, as well as assisting in better informing U.S. residents about new USGS products and services.

5. NUMERICAL SUMMARY OF CONSORTIUM ACTIVITIES

AmericaView's 30 StateViews reported on 382 activities for GY 2010. Appendix 1 (following) summarizes these activities by program area:

A. C-000 Consortium Development and Outreach Activities (**112 total**)
B. D-000 Data Archive and Distribution Activities (**103 total**)
C. E-000 Education Activities (**99 total**)
D. R-000 Research Activities (**69 total**)

Each StateView focuses on the needs of the residents of its state given the strengths of its consortium members. Appendix 3 illustrates the differences in StateView activity emphasis for GY 2010.

The complete StateView progress reports may be obtained by contacting Rick Landenberger at (304) 293-9468 or Debbie Deagen at (406) 994-6120.

APPENDIX 1 – AmericaView Grant Year FY2010 Activities

A. CONSORTIUM DEVELOPMENT AND OUTREACH ACTIVITIES
(112 total activities)

C-000 - Other

- [CO] ColoradoView designed a new website during mid-summer, and rolled it out successfully in August of 2011.

  ColoradoView's current website now contains information on current consortium members, principal scientists, research scientists, student interns, downloadable data, ongoing and completed research, tutorials, and links to various outside sources for RS/GIS data at the local, state, and national scales. Additional links are provided to remote sensing intensive programs housed within Colorado State University, such as the USDA UVB Monitoring and Research Program.

- [IN] Larry Biehl assisted with on the proposal that was submitted to NOAA in January, 2011.

External vehicles (52 total activities):

(C-001) StateViews presented their programs and activities at state, regional, and national conferences and meetings (e.g., ASPRS, PECORA, State GIS user's conference), accounting for 20 total activities. These presentations increased awareness of the StateView mission, and increased opportunities for partnerships. Highlights follow.

- [AK] UAF /GINA/AlaskaView participated in the Alaska Surveying and Mapping Conference through attending, sponsoring, submitting posters, manning a booth, and giving multiple well attended presentations. AmericaView was a recognized and respected organization by attendees that took the time to stop and talk with AlaskaView members.

- [AR] Bruce Gorham gave a presentation on terrestrial habitat mapping using Landsat TM data at the Greater Ozarks Terrestrial Habitat Mapping Meeting in West Plains, MO (19 Jan 2011) and two presentations titled "Land Cover Mapping Using GEOBIA and High Resolution Aerials" and "A Long-term Temporal Approach to Mapping Pine Plantations with GEOBIA" at the Arkansas GIS Users Forum (1 Sep 2011). Dr. Tullis coauthored a presentation titled "On Characterizing the Stability of Titan's Lake Regions" in the *Proceedings of the Lunar and Planetary Sciences XLII* in The Woodlands, TX (7-11 Mar, 2011).

- [CA] Presented AV to the CA Space Grant Consortium.

- [GA] Drs. JC Seong, Mark Patterson and JB Sharma represented GaView at the 2010 AmericaView Fall Technical Meeting at Madison, WI, during 10/10-14/2010. Drs. JC Seong, Mark Patterson and JB Sharma also represented GeorgiaView at the 2010 Geospatial Conference at Athens, GA, hosted by GA URISA.

- [IN] Larry Biehl attended the *Indiana GIS Conference* on March 1 and 2 in Muncie, Indiana and presented posters on IndianaView and AmericaView. 260 people attended

the conference. Copies of 8 IndianaView fact sheets were made available; 20 fact sheets were picked up. One of the highlights of this conference was the information provided on the 12-inch orthophotography and 1.5 m posting LiDAR data collections that were underway. This is the first state wide collection for LiDAR data; the last state wide orthophotography was collected in 2005.

- [IA] Three Conference presentations were made from partial funding from AV. One undergraduate student presented a conference presentation at a regional NASA space grant consortium meeting in Minneapolis. The same student also presented at AAG 2011 in Seattle, WA. One Graduate student presented at the SIAM conference in Long Beach, CA. The details are given below.

  1. Wille, A., and Sugumaran, R., 2011. Spatial Temporal Analysis of Crop Yield Variability at the Field Level. AAG meeting, April 13—16, Seattle, WA.

  2. Wille, A., and Sugumaran, R., 2011. Spatial Temporal Analysis of Crop Yield Variability using remote sensing and LiDAR data. NASA -regional space grant Consortium meeting, Sep 16—17, Minneapolis, MN.

  3. Oryspayev, D., Sugumaran, R., Gray, P. 2011. Leveraging the General-Purpose Computation on Graphics Processing Units (GPGPU) Architecture for Lidar Data Processing. SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS11), March 21-24, Long Beach, California.

- [KS] The following presentations were made concerning floodplain modeling and dam breach analysis (for which seed funding is provided by AmericaView):

  January 2011 - Kansas Precision Agriculture Conference, Salina, Kansas
  April 2011 - USGS EROS Data Center, Sioux Falls, South Dakota
  June 2011 - Nebraska Floodplain and Stormwater Managers Association, Mahoney State Park and Conference Center, Nebraska

- [KY] The KyView Director presented research at the *Kentucky GIS Conference* and spoke with attendees about KentuckyView.
  The KyView Director also participated in the Geospatial Education Conference (GeoED '11) in June at Jefferson Community and Technical College - where she informally discussed KyView opportunities with attendees.

- [LA] Four presentations were made in this past grant year:
  - Data was presented to the Louisiana GIS Council meetings on behalf of AmericaView for LaView activities.
  - We provided a sponsor booth and presented at the Louisiana RS/GIS Conference (May 3-5) in New Orleans.
  - We presented to the Mid-South ASPRS group at that time. .
  - We sponsored and gave a talk on behalf of LaView and AmericaView program for the 2011 Louisiana Hurricane Season Geospatial Data Mining Workshop held June 23, 2011.

    The workshop highlighted geospatial data sets related to hurricane season preparation, emergency response operations, and ongoing recovery efforts. Presentations were an overview of the data clearinghouses, applications, and data acquisitions of federal and state

agencies that collect and host geospatial data, as well as operations and planning updates for the 2011 hurricane season. Participants followed along on desktop computers while identifying, locating, and viewing geospatial data and information.

- [MD] Tom Mueller and Jay Morgan conducted a mini-workshop on MarylandView and Earth Observation Day at the 24th Annual Towson University GIS Conference. In addition, Jay Morgan conducted presentations on MarylandView at the annual meeting of the Maryland Association of Science Teachers and at a meeting of the Maryland Association for Environmental and Outdoor Education. Approximately 85 teachers attended these two meetings.

- [MT] Christine Sommers-Austin and Rick Lawrence presented the live online completed phases and operational Emergency Response Database Application Project at the AmericaView Fall Technical Meeting in Madison, WI in October 2010 to the approximate 40-50+ AmericaView members and supporters present. At the fall meeting, we had an active booth during the poster session discussing and encouraged participants to fill out the online emergency response questionnaire. We asked attendees to fill out the questionnaire 'on the spot' or to take project business cards as a reminder to fill out the questionnaire later and to give cards to their colleagues to do so also.

  Lance Clampitt presented MontanaView and AmericaView resources as well as the live online Emergency Response Database Application Project at the MAGIP Fall Technical Session in Helena, MT October 28, 2010 to the approximate 20+ members and supporters present. He answered questions and encouraged them to participate in the project.

  Van Shelhamer presented a geospatial training to 8 Cub Scouts (ages 9 and 10) in Carlsbad, CA on October 19, 2010. The AmericaView organization's purpose was explained to them as well as a brief overview of remote sensing and images.

  Rick Lawrence presented "Landsat and Education: An AmericaView Perspective" at the Association of American Geographers conference in Seattle, WA on April 14, 2011 to approximately 30 people.

  Van Shelhamer presented remote sensing services and resource materials available through MontanaView at U of MT Western in Dillon, MT during his 2011 spring semester GIS course to 17 students.

  Van Shelhamer also presented the MontanaView program and activities at the 2011 Remote Sensing Teacher Institute in Livingston, MT on June 27-30 to 8 teachers that will impact approximately 270 students per year.

- [NE] CALMIT/NEVIEW co-sponsored *2011 NE GIS/LIS Symposium (April 19-21, 2011 in LaVista, NE)* and a logo was included in the program. We also presented a poster entitled "Geospatial Information for Nebraska" describing NEView activities and resources. The symposium had almost 200 attendees (196).

- [NH] (1) The NHView Director participated in a panel of journal editors at the AmericaView Fall Technical meeting in Madison, WI. He is the editor-in-chief of Photogrammetric Engineering and Remote Sensing. The panel was on publishing in the geospatial sciences and approximately 50 attendees were present. (2) A paper was

presented at the ASPRS Fall Conference in Orlando on our work (Congalton and a graduate student intern]) on change detection and forest fragmentation analysis in the Coastal Watershed of New Hampshire. Approximately 25 attendees were at this presentation. (3) A paper was presented at the ASPRS Spring Annual Conference in Milwaukee, WI on our work (Congalton and a graduate student intern) on object-based image analysis in northeastern forests. Approximately 30 attendees were at this presentation.

- [NC] Presented one workshop in the annual Fall ASPRS meeting in Oct., VA. Gave one presentation at the AV Fall Technical Meeting in Oct., OH.

- [ND] A UND Geography Master's student and Dr. Brad Rundquist (NDView PI) presented "Object-Based Land Cover Mapping of Eastern North Dakota Breeding Bird Survey Routes" at the annual meeting of the Association of American Geographers in Seattle, WA. That research was funded by NDView.

  Two UND Geography Master's students and Dr. Brad Rundquist (NDView PI) presented "Object-Based Land Cover Mapping of Eastern North Dakota Bird Survey Routes using High-Resolution LiDAR and Multispectral Aerial Imagery" at the annual meeting of the Great Plains/Rocky Mountain Division of the Association of American Geographers in Lawrence, KS. That research was funded by NDView.

  A UND Biology Master's student, Ms. Cami Dixon (U.S. Fish and Wildlife Service), Dr. Brad Rundquist (NDView PI), Dr. Brett Goodwin (UND Biology), Dr. Katherine Yurkoni, (UND Biology), Katherine Mehl (UND Biology) and M.A. Ahlering (The Nature Conservancy) presented "The Influence of the Surrounding Landscape on Grassland Songbird Diversity in the Devils Lake and Arrowwood Wetland Management Districts of North Dakota" at the annual meeting of the North Dakota Chapter of The Wildlife Society in Minot, ND. That research was partially funded by NDView.

- [OH] **Ohio GIS Conference:** This workshop, sponsored by the OhioView Consortium, introduced emerging techniques and applications available to extend the usefulness of remotely sensed imagery beyond traditional land cover mapping applications to 60 RS professionals. The Ohio GIS Conference is a joint two-day conference put on by the Ohio chapter of URISA, the OGRIP (Ohio Geographically Referenced Information Program) and the Ohio State Office of Information Technology. The 415 participants at the two-day event represented state agencies, local and regional governments, public utilities, universities and private organizations.

- [PA] Drs. Mueller and Morgan held a session on MarylandView and PennsylvaniaView at the TUGIS Conference, there were 5 people attending the session. Dr. Mueller presented his Pictometry work.

- [PA] Presented at the Pennsylvania Workshop on Remote Sensing (May 2010). The workshop occurred in May and had two topics – The International Charter and Mobile LIDAR. There were approximately 50 people in attendance from all over Pennsylvania.

- [WI] WisconsinView presented at the WLIA (Wisconsin Land Information Association) Annual Meeting in Madison, WI, February 17, 2011.
  WisconsinView presented at the ASPRS Annual Meeting May 2-7, 2011 in Milwaukee, WI.

- [WY] Dr. Sivanpillai presented his paper in a special session chaired by Dr. Landenberger in the 2011 ASPRS Annual Conference. A conference proceedings paper was also published.

  Citation: **Sivanpillai, R.**, 2011. WyomingView applied remote sensing research activities in the era of no-cost Landsat data. Proceedings of the 2011 ASPRS Annual Conference, Milwaukee, WI.

(C-002) One StateView published in a trade journal to highlight the utility of remote sensing and the value of StateView programs. Trade journal publications target potential partners in industry. Industry partners offer unique and beneficial opportunities in AmericaView.

- [IA] Two articles were accepted in peer-reviewed journals and partial funding came from AV. The details are given below.
  1. Oryspayev, D., Sugumaran, R., DeGroote, J., and Gray, P. 2011. LiDAR data reduction using vertex decimation and processing with GPGPU and multi-core CPU technology. ***Computers and GeoSciences*** (in press).

  2. Oryspayev, D., Sugumaran, R., and DeGroote, J. 2011. Development of Spreadsheet based SDSS. ***International Journal of Decision Support System Technology (IJDSST),*** *In Press*.

(C-003) Three StateViews delivered presentations to users' groups or geospatial consortia. Presentations to user groups are very effective in increasing awareness of the StateView and AmericaView mission, and create opportunities to partner. Highlights follow.

- [MS] UMGC/MSView participated in multiple meetings of the MS Institutes of Higher Learning (IHL) Remote Sensing Council. Meetings were held to discuss activities within the state and to collaborate where possible on curriculum development. Some of the council's activities this year were to discuss potential funding avenues for the MARS Mentorship program as well as support and management of the IHL Software Licensing program supplying ESRI, ERDAS, and ENVI licenses and training to all IHL affiliated organizations.

  Of note this year, MSView provided support in the hosting Web/conference calling abilities to the council in order to expand participation in the face of tightening budgets. MSView will continue this support and looks to increase participation in grant year FY2011.

- [NC] Delivered a presentation at the ASPRS meeting in Oct., 2011, VA. The title of the workshop is "Analysis and Application of Polarimetric Synthetic Aperture Radar (SAR)".

- [WI] During "Open Access Week 2010 - Putting the Wisconsin Idea Online," WisconsinView presented a summary of the data distribution activities of WisconsinView and AmericaView to 30 library and outreach professionals at the University of Wisconsin-Madison. October 19, 2010.

(C-004) Four StateViews have arranged or delivered presentations at planning meetings at local, state, or federal agencies to promote the StateView program and the services provided. These presentations were specifically tailored to address the utility of remote sensing in planning applications. Highlights follow.

- [LA] LaView worked as a board member on the coordinating board for the Louisiana Remote Sensing GIS Conference that was held in New Orleans, Louisiana May 3-5, 2011.
  LaView also sponsored an exhibit during the workshop and worked the event.
  What did the Workshop Provide?
  - Over 175 attendees
  - More than 20 poster presentations
  - More than 30 paper presentations
  - Guest Speakers
  - Vendor exhibits
  - Achievement award
  - Technical workshops
  - Special interest group meetings
  - Continuing Education Credits (CEU)
  - South Louisiana's finest crawfish.

- [NH] An overview of AmericaView and NHView were presented to two classes at the University of New Hampshire that the NHView Director gave guest lectures. Approximately 100 total students were in attendance.

- [OH] Several OhioView PIs are on committees with the East Lakes Division of ASPRS.

- [WY] Dr. Sivanpillai gave a talk to the Wyoming Agricultural Experiment Station scientists on 23 Feb 2011. In this talk he highlighted the value of remotely sensed data for agricultural applications including high-resolution aerial images.

  Impact: These presentations and others we have made over these years have helped us to highlight the value of remote sensing for agricultural applications. Faculty members in two departments are inviting Dr. Sivanpillai to discuss opportunities for incorporating remote sensing in their research activities.

(C-005) StateViews have engaged in 18 activities to visit agencies and elected officials at the federal, state, regional, county, and district levels**.** These visits increase awareness of the StateView and AmericaView mission, foster support, and increase the number of partnerships. Highlights follow.

- [AR] Bruce Gorham presented a geographic object-oriented image analysis (GEOBIA) / remote sensing methodology for mapping terrestrial habitats over large areas using Landsat imagery and the National Elevation Dataset to the Arkansas Natural Heritage Commission (14 Dec 2010), and a presentation on GEOBIA / remote sensing approach to mapping shortleaf pine habitat in southern Missouri and northern Arkansas to the Missouri Department of Conservation in West Plains, MO (19 Jan 2011). Dr. Tullis presented "Planetary Remote Sensing" at a public workshop to celebrate the 10th anniversary of the Arkansas Center for Space and Planetary Sciences, Fayetteville, AR (9 Dec 2010); the State of Arkansas support for the Arkansas Center for Space and Planetary Sciences has been critical for the Center's success and ArkansasView staff

have supported the program's graduate students and are participating in NASA proposal development opportunities.

- [CA] A folder of fact sheets and imagery was given to the Legislative Outreach authorities at UC Davis authorities to pass along at their hill meetings. The materials provide examples of the utility of civilian remote sensing in California.

- [GA] Dr. Seong presented GeorgiaView activities at the GIS workshop with Georgia Department of Transportation in December. Six people participated.

- [ID] Gessler and Sankey visited all four of the Congressional delegates from Idaho in Washington DC to communicate about remote sensing and IdahoView/AmericaView. In addition, IdahoView collaborators have been engaged in the statewide development of proposals for Regional Resource Centers (Gessler, Weber, Glenn, Godfrey) and have suggested that IdahoView be closely linked with these activities both through the collaborative personnel and through use of the IdahoView web site as it is linked to these activities. IdahoView collaborators are involved in both initiatives.

- [IN] Larry Biehl (IndianaView PI) visited with staff from all nine Indiana congressional offices and both senatorial offices on March 9-10.

- [KS] KansasView Coordinator Kevin Dobbs visited members of the Kansas Congressional Delegation and frequently contacted Congressional staff members during the year to apprise them of their activities. In 2011 he visited the Washington, DC offices of both Kansas Senators and all but one of the Kansas Representatives.

- [LA] The LAView PI met with local governing officials in Iberia Parish and developed a GIS and Imagery Needs Assessment for the Parish, and now has a graduate student from their program that was hired as GIS Coordinator for the Parish. The PI also presented to Architects and Architecture Students for the acquisition of imagery in the redesign of the University of Louisiana at Lafayette campus as part of a City of Lafayette redesign project.

- [MI] The MIView Coordinator met with Stabenow's legislative assistant, Doug Messana and Dingell's legislative assistant, Greg Sunstrum. Handouts were given to each on various applications of the Landsat series of satellites as well on MichiganView and AmericaView.

- [NE] The NEView Coordinator visited two Congressional and two Senate offices during the WBM and presented educational materials about AmericaView and NEView.

- [NH] The NHView Director maintains contact within Senator Shaheen's office and regularly communicates NHView activities to Ms. Sara Dewey of Senator Shaheen's staff.

- [NC] The NCView PI visited North Carolina's 1st and 3rd congressional districts in DC.

- [OH] OhioView fact sheets were sent to Ohio state legislators. The OhioView State Coordinator made educational visits to Ohio Senate and House of Representative offices in Washington DC, and mailed an informational postcard announcing the AmericaView Fall Technical meeting hosted by OhioView.

- [VA] VirginiaView personnel provided legislative outreach on statewide consortium activities to Senate and Congressional representatives for the Commonwealth of Virginia.

- [WV] The WVU Congressional relations director has been a strong supporter of AmericaView, and represents WVView and AmericaView on our behalf on an annual basis. Each year, West Virginia View provides information to the WVU Congressional Relations director about West Virginia View, its role, contribution to the university, and to the state. This information is included in a formal, written request by the institution to our congressional delegation. West Virginia University does not allow faculty to visit Congressional Offices in their capacity of employees of the institution without the express permission and support of the university's congressional relations staff. Copies of the annual WVView material, as well as a written explanation of WVU policies, can be furnished upon request.

- [WI] WisconsinView visited offices of both U.S. Senators from Wisconsin and five U.S. Representatives from Wisconsin.

(C-006) Five StateViews engaged in activities to identify internship or exchange opportunities for students or scientists / faculty. These helped strengthen and broaden student educational experiences, and often resulted in employment opportunities. Highlights follow.

- [CO] *ColoradoView, in cooperation with Colorado State University's Natural Resource Ecology Lab (NREL) has added two new Principal Investigators, Dr.'s Paul Evangelista and Jim Graham, and three student interns. Intern activities will be coordinated by Dr. Wei Gao and managed by Dr.'s Paul Evangelista and Jim Graham.*
  ColoradoView PI's and student interns continue to work with scientists from the NREL and the National Institute of Invasive Species Science (NIISS; www.niiss.org).
  Accomplishments include:
  1) maps of invasive tamarisk along the Arkansas River in southern Colorado;
  2) modeling high priority invasive species across the nation;
  3) assistance provided to USGS scientists to model invasive Lionfish in their native and invasive ranges;
  4) Landsat imagery used to classify pine beetle infestations in Colorado forests; and
  5) continued development and enhance of the ColoradoView website.

- [GA] Dr. Seong has continued to send undergraduate students for internships with companies and public organizations, including the Atlanta Regional Commission since fall 2010. J.B. Sharma at Gainesville State College has also developed an internship for an undergraduate student with a mini-grant.

- [LA] Two undergraduate students worked on an internship project thru LaView and have written updates for their experiences. These internships supported consortium membership with data development in the emergency/event response area, utilizing geospatial data to support state applications and research.

- [MD] Three students interned with Maryland state and local government agencies. Two students were involved with projects to derive land cover maps from high-resolution (6 inch), 4-band (VB, VG, VR, NIR) orthophotography. One student was involved in mapping impervious surfaces for a county using Landsat imagery.

- [NH] During this time period, one graduate student and several undergraduates had internships.
    1. One of the undergraduates completed her senior project with the NHView Director as part of her BS in Environmental Science. She investigated the use of the NOAA C-CAP land cover maps for effective change detection analysis in NH and produced a poster of her work.
    2. Another undergraduate intern worked with our graduate student intern on our forest fragmentation analysis project.
    3. A new undergraduate intern was hired for the summer of 2011. She took over on the forest fragmentation project.
    4. Finally, NHView supported an invasive species research project in cooperation with Dr. Tom Lee and an undergraduate student. This project is using spatial data analysis to investigate the spread of an exotic tree species in southeastern NH.

Internal Vehicles (21 total activities)

StateViews were involved in a range of activities designed to add additional Remote Sensing courses and course material resources. These additional courses broadened the range of remote sensing courses and added depth to the geospatial curriculum at StateView institutions.

(C-007) Software sharing among consortia members comprised five StateView activities. Sharing licenses helped leverage course costs and resulted in more courses offered at partner institutions. Highlights follow.

- [GA] We purchased PG-STEAMER 4.2, a software program that supported 46 undergraduate and graduate students to learn remote sensing and photogrammetry at University of West Georgia.

- [MS] UMGC/MSView personnel continue to support the state-wide IHL software licensing for ESRI, ERDAS, and ENVI. This includes the direct support of the state licensing coordinator in testing and evaluating issues related to license distribution amongst state license hubs for new licensing policy and practices by ESRI and ERDAS. Management and code distribution for ESRI Virtual Campus codes for north Mississippi is ongoing.

  The annual state report on the licensing program is available at: http://www.maris.state.ms.us/pdf/IHLSiteLicense/SL_report_2011.pdf

- [NH] Continued to provide a license for the ERDAS Imagine Image Processing Software to a Professor in the Civil Engineering Technology Program (an Associates Degree Program) at the University of New Hampshire. This license allows that faculty member access to the software both for his teaching and for completion of his dissertation.

- [OH] Pete Clapham at Cleveland State University headed up an effort to spread the resources of bulk purchased software amongst OV consortium members. The software shared included Erdas, ENVI, ER Mapper and PCI. All licenses were updated for the entire OhioView consortium for 2010-11. The Ohio State University includes their hundreds of seats in the negotiated price, so OhioView universities are able to share access to the software seats purchased. We've recognized that object-oriented image

processing is a significant cutting-edge technology. We've budgeted its inclusion into our software pool, and we're trying to determine the best strategy for making OhioView a leader in statewide OOIP teaching and research.

- [WV] The Erdas Imagine license coordinated by WV View, and purchased with partial support from WV View, provides 60 seats, which are shared across the WV View partner educational institutions:
  WVU Geology and Geography (3 professors, 2 classes of 50 students, as well as 10 students doing graduate research),
  WVU Resource Management (1 professor and 12 students doing research),
  Marshall University (1 professor, 1 class of 15 students),
  West Virginia Wesleyan (1 professor, 1 class of 5 students) and
  Glenville State College (1 professor).
  This is a total of 7 professors, 4 classes of 83 students, and 22 students doing research.
  The license was renewed in December of 2010.
  The licenses are centrally served by WVU. The sharing of these licenses results in considerable savings to the participating institutions, has promoted cooperation in the state, and has greatly enhanced the access to remote sensing hands-on training for students. In recent years the partner institutions have increasingly taken on the burden of financing this activity, recognizing its many benefits.

(C-008) StateViews were involved in five activities that delivered faculty training activities among consortia members or within their own institution. These training activities, be they formal or informal, increased the number of faculty who are familiar with and capable of using remote sensing in their disciplines. Highlights follow.

- [AR] ArkansasView provided a series of remote sensing workshops for the Arkansas Center for Space and Planetary Sciences (CSPS); the topic of the workshops was the application of commercial remote sensor data processing tools in planetary data analysis; this effort has contributed to a NASA proposal development collaboration with CSPS that is focused on the exploration of the outer moons.
  ArkansasView provided a LIDAR workshop for a faculty member and student from the Department of Civil Engineering which was recently awarded a NCALM LIDAR data collection grant; ArkansasView previously supported the proposal for this grant by providing the LIDAR data collection specifications; in exchange, the Department of Civil Engineering has shared the data with ArkansasView for educational (classroom) activities.
  Between September 2010 and January 2011, Bruce Gorham provided half-day, one-on-one eCognition tutorials to two individuals.
  Between September 2010 and September 2011, Jason Tullis provided approximately 10 hours of ASD FieldSpec spectroradiometer support to an Entomology PhD candidate as part of the development of a remote sensing-assisted spotted knapweed monitoring program.

- [LA] Offered training to LAView consortium faculty members during the 15 continuing education courses they offered that are described in E-007.

- [NH] Provided assistance to two faculty members in the Geography Department at the University of New Hampshire on both image processing and GIS techniques and analysis. Was contacted in the Fall of 2010 by a Professor at St. Anselm's College in

NH about help in developing a geospatial information course. Offered to help by reviewing the proposal they will write and to supply lecture/lab materials for examples.

- [ND] We provide informal assistance (primarily data and software help) to a variety of people on the UND campus and within our consortium. As general examples, we help the Biology Department maintain its GIS software and we share our image processing software (ERDAS) with them through our HEAK license. We also have engaged in many "informal education sessions" with graduate students from several departments who are struggling with data conversion, data manipulation, and/or data analysis, usually with ArcGIS. We also share our ERDAS HEAK license with Space Studies and Geology and Geological Engineering. In the consortium, we work most closely with Turtle Mountain Community College, and we assist with some of their software and hardware questions.

- [OH] At our fall meeting held November 5, 2010 at Central State University, training sessions were organized to educate the members in the use of OPTICKS and the Open Geospatial Consortium to discuss web enablement translators and how they relate to remote sensing.

(C-009) StateViews were involved in five activities designed to promote collaborative research. Collaborative research leveraged scarce research funding and can broaden project goals and objectives. Highlights follow.

- [ID] Regular communication has continued between the three main universities and a new NSF EPSCOR project has been initiated between these Universities and statewide community colleges and other higher education entities. The first step is providing improved cyberinfrastructure access to these other entities. This is the first step in then working more closely to engage these entities more actively in IdahoView.
  All of our partners and their recent and ongoing remote sensing work are featured and continually updated on our webpage. A K-12 school, Moscow Outdoor Science School, was recently added as a consortium member.

- [MI] MichiganView continued to maintain the Confluence wiki server that provides both the AmericaView wiki and the MichiganView website.

- [ND] We updated the NDView listserv regularly. In FY10 we sent information about scholarship opportunities (NDView scholarship), conferences (GIS, remote sensing, and geography conferences), and employment opportunities.

- [TX] TexasView worked to Promote Collaborative Research within its Consortium. Three Video conferences and numerous phone conversations to collect information about research foci and interest levels have been conducted. Each TexasView member has been contacted and asked about research interest. Although no proposals have resulted to date, work continues to overcome institutional inertia and realize this goal.

- [WI] WisconsinView continued to make daily MODIS products available to all StateView states. Alaska and Hawaii are outside of our antenna's reach and have their own direct reception capability. 30 products for each of the other 34 states are currently available on a daily basis. Connecticut and Rhode Island still need to be added to the product queue.

(C-010) StateViews developed collaborative programs (certificates, transfer agreements, MOUs to support StateView consortium efforts, recruiting consortium members, etc.) through five activities. These collaborative programs supported existing and fostered new research opportunities. Highlights follow.

- [CA] The RS curriculum is under review by the StateView PI. Two of nine lectures and labs are completed.

- [CO] Dr. Ramesh Sivanpillai, coordinator of WyomingView, traveled to Fort Collins and presented a talk at CSU/NREL to approximately 20 people with ties to ColoradoView. CV PI's are actively soliciting consortium members from their associates and contacts.

  FY10 consortium members include:
  - USDA UV-B Monitoring and Research Program
  - Citizen Science (CitSci.org); and
  - The National Invasive Species Program housed in the U.S. Geological Survey Fort Collins Science Center (FORT).

- [OH] They have been working on consortia educational programs such as a virtual university, shared class curricula, and training for private companies. This effort is being led by Pete Clapham of Cleveland State University. The University of Toledo is coordinating a multi-university project that utilizes the same lesson plans over several universities' classes to study the urban heat island phenomenon.

- [PA] PA View added 3 new members - Clarion University (Northwestern part of Pennsylvania), Wilson College (near Harrisburg) and Villanova University (near Philadelphia) via mini-grants of $1,000 to each institution. The contracts between PA View and these colleges have been approved and they are currently working on their projects. The projects include: Clarion - creation and distribution of remote sensing poster for teachers in their area, Wilson College - creation of K - 2 remote sensing project for teachers in their area, Villanova University - purchasing of high resolution remote sensing images for research of a local park.

(C-011) One StateView is involved in generating funds to hire a coordinator.

- [TX] TexasView continued to support Rebecca Dodge as Coordinator for TexasView. As always, her contributions to the organization far outweighed the modest contributions TexasView is able to make.

Financial vehicles (12 total activities):

(C-012) One StateView obtained a grant for training middle and high school science faculty in RS technology and applications. AmericaView is able to leverage professional development grants to extend or otherwise support training and development activities.

- [WV] A three graduate credit summer institute was taught to 14 West Virginia teachers in 2011. Teachers applied what they learned in the institute during the fall, as a

requirement for participation. WVView supported an additional teacher and supported equipment purchases for all participants.

(C-013) StateViews were involved in three activities designed to fund training for K-12 teachers. Training K-12 teachers is essential for successful integration of geospatial technology in the classroom. Highlights follow.

- [LA] Worked with the WETMAAP team over the past 12 months and are working on a formal MOU between the WETMAAP team (CNL World) and LAView (RAC) to continue formal teaching in future K-12 programs. LAView participated in Earth Observation Day activities in 2011.

  EOD Update for LaView:
  Brent Yantis presented EOD to a charter school in a rural parish. He worked with the entire 9th grade (53 students) through their science coordinator.

  Imagery used:
  - ❖ Large format hardcopy Landsat imagery of Louisiana, Washington D.C. and *Earth As Art* to illustrate the use of satellites.
  - ❖ Powerpoint presentation to illustrate emergency response (National Guard, Homeland Security for La., Hurricanes Katrina, Rita, Gustav, Ike, and Lilli) International Charter for global response. All using remote sensing looking at the earth.
  - ❖ NOAA Night Lights imagery to illustrate population across the globe, with a great response from students and teachers alike.
  - ❖ NAPP and NAIP imagery for the school, surrounding agricultural lands, and Spring Bayou Wildlife Management Area. This is a meandering ridge and swale area which was left from the movement of the Red River. We began doing landcover assessment at the school and then moved to maps showing surrounding areas. This area is unique because of the convergence of the Red River, Black River, Mississippi River and Atchafalaya River. Which also includes the Grand Cote NWR, Pomme DeTerre WMA, Lake Ophelia NWR, Grassy Lake WMA, Red River WMA and Three Rivers WMA.

  Results: The students and teachers were surprised to see their location in proximity to all these management areas and the rivers. The 9th grade science coordinator, Mrs. Saucier said, "It is funny, they live in and out of these areas every day but don't realize how close all these different landscapes are to their school". Yantis left images of the school and copies of the EOD state posters (with updated dates) for the teachers.

- [SD] The Geospatial Technology for Educators workshop was held May 31 - June 3 at EROS with 20 K-12 educators, two post-12 technical school educators, and one geography graduate student in attendance. The geospatial topics of remote sensing, GPS and GIS were presented during the workshop by the instructors (3), EROS personnel (3), and the GIS director for the City of Sioux Falls. Each educator received a GPS unit, a $175 stipend, an Esri book (on DVD) and software, reduced tuition, and other related materials. Lesson plans involving geospatial technologies were prepared by each of the attendees. The total number of students impacted by these educators for the 2011-2012 school year was estimated to be 2060.

- [WV] West Virginia View partly sponsored a teacher's participation in the Summer Institute.

(C-014) StateViews have been involved in eight activities to partner with other institutions that sponsor training (Space Grant, Extension agents, insurance companies, 4H, etc.). These partnerships leveraged resources and strengthened the state consortia. Highlights follow.

- [AL] Held workshops covering the statewide planning project and the specifics of the current Alabama Geospatial Strategic Plan. The annual Rocket City Geospatial Conference was held on November 16, 17 and had over 200 attendees. AlabamaView sent a grad student to the conference who placed 1st in the student poster competition.

- [CA] Collaborations among Spacegrant Affiliates were established focusing on workforce training.

- [ID] Significant strides have been made in expanding STEM training across the state via the EPSCOR Program. We have gathered and posted a list of remote sensing courses and institutions that offer courses on our webpage. In this list, we also indicate which courses are taught live at a specific location versus broadcast across the state via Distance Learning. Issues of credit accounting are also under discussion.

  [IA] A student worked with the state DNR using LiDAR data processing.

- [MD] The secondary school teacher training described in E-020 was funded through a partnership of a NASA IPY grant and the Maryland Space Grant Consortium. AV funding was used to hire a graduate student to work with Dr. Morgan on the project.

- [MS] UMGC/MSView continued to pursue alternative funding avenues for the MARS program but state budget constraints and the tightening of all budgets in general resulted in a negative response from all attempted sources.

- [MT] Partnered with GeoEssentials (a non-profit) to brainstorm on possible MT teachers to participate in Earth Observation Day 2011 and to continue discuss logistics and related costs of the future remote sensing trainings, especially the planning of a summer teacher institute.

  Planned and worked on all the details for the Remote Sensing Teacher Institute in Livingston, MT on June 27-30, 2011.

- [SD] On June 15 we worked with eight high school students who were attending Youth Engineering Adventure camp at South Dakota State University. We showed them how to collect GPS waypoints, download them to ArcGIS, and use high-resolution remotely sensed imagery in the GIS to assess the accuracy of the collected points.

StateView/AmericaView vehicles (27 total activities)

(C-16) StateViews engaged in five activities to share Remote Sensing curricula developed by one StateView with others. Shared curricula reduced the efforts involved in developing new curricula (and supported resources such as lab exercises), that allowed StateView partners to do more with less. Highlights follow.

- [CA] The RS Curriculum is still under review and not ready to be shared yet.

- [GA] GeorgiaView (Dr. Seong) continues to maintain the online remote sensing course Website (http://www.avuniv.org/). Any updated course material and curricula will be shared with other AV members through the Website. One faculty member (Diana Cooksey, Montana State University), was added to the AVUNIV online remote sensing course recently as an instructor.

- [IA] IowaView continued to develop LiDAR related educational materials, in part with AV funding, and make it available to other consortia:
    1. A new web-based training video was developed and it is available at: http://www.geotree.uni.edu/GeoLITE.aspx
    2. IowaView also improved LiDAR data download functionalities such as on the fly DEM generation. This is available at: http://geotree2.geog.uni.edu/lidar/

- [MD] Updated remote sensing and digital image processing tutorials were included with the launch of the revised MarylandView Web site at (http://marylandview.towson.edu/).

- [NC] One set of lab handouts with datasets for an introduction to remote sensing course were provided to AV and are hosted at the AV web site. The lab handouts were based on the Imagine Version 10.

(C-020) StateViews were involved in nine activities that improved and maintained in-state communications via teleconference, e-mail, StateView meetings and conferences. This regular communication has resulted in improved consortium activity, effectiveness, and grant procurement. Highlights follow.

- [AL] The University of North Alabama attended the Rocket City Geospatial Conference and visited with an AlabamaView-supported student. Tuskegee University has been added as a partner on the AlabamaView website and we have discussed potential collaboration. Tuskegee established a Climate Change Center when Gilbert Rochon became Tuskegee's president. They will be invited to future AlabamaView meetings.

- [ID] Via collaboration with NSF EPSCOR cyberinfrastructure activities, cyberseminars are being offered to assist researchers and stakeholders in accessing imagery, in the first instance, via the INSIDE Idaho geospatial repository. Six cyberseminars were organized in FY2010. In addition, Idahoview's 4th annual meeting was held in Boise in May, 2011. The main purpose of the meeting was to facilitate communication and assign tasks and responsibilities among the key organizations and members of the stateview especially due to the leadership transition from University of Idaho to Idaho State University. The 4th annual meeting agenda and photographs from the meeting are attached as testimonials. Ten members attended the meeting.

- [MT] Three consortium meetings were held via teleconference with 5-8 members attending each meeting. Topics included AV National news such as Landsat 8 and 9 technical news, Earth Observation Day 2011 plans; and StateView news such as the Emergency Response Database Application Project, and research projects undertaken by consortium members.

- [NH] The website has been completed and successfully launched. The address was shared with all members and feedback was solicited. Feedback was very positive. New material has been added to the website as available.

- [OH] OhioView's weekly conference calls serve to strengthen the consortium as members are able to discuss important issues relative to remote sensing in higher education and work to focus OhioView's efforts to the benefit of its members. At our fall meeting held November 5, 2010 at Central State University, training sessions were organized to educate the members in the use of OPTICKS (Ball Aerospace Open Source software) and the Open Geospatial Consortium to discuss web enablement translators and how they relate to remote sensing.

- [PA] Dr. Mueller met with the members of PA View (Penn State, Villanova, Wilson and Clarion) in late February. Each member gave an update on their project and they discussed future possible projects and collaborations.

- [TX] TexasView held 4 video conferences during which TexasView members discussed research foci, cooperate research opportunities, training needs, and teaching and training resources available for sharing among institutions. Also discussed were research tools and data-gathering devices that might be shared among institutions.

- [VA] VirginiaView has added a partner at Tidewater Community College, listed as one of the nation's largest community colleges, and one of the leaders in technology education in the community college sphere.

(C-021) StateViews were involved in 12 activities to participate in statewide geographic data committees. Participation in these committees resulted in increased communication and shared ideas and resources. Highlights follow.

- [AL] 2010 Rocket City Geospatial conference was held successfully with over 200 attendees. There was also some communication with the newly formed Alabama Geographic Information Council.

- [AK] UAF/GINA/AlaskaView participated and lead discussions about the current and on-going statewide orthoimagery and DEM collections. Presented status updates and training for data and services made available through UAF/GINA/AlaskaView to various state GIS user group meetings including the Alaska Arc User Group (AAUG), North Alaska Spatial Data User Group (NASDUG), and the Statewide Digital Mapping Initiative's Technical Advisory Group.

- [ID] IdahoView collaborators have continued their involvement in the State Framework committees. Gessler and Godfrey have participated in two imagery working group meetings. Glenn has been leading the elevation technical working group, and Weber leads the land use land cover technical working group. Weber also participates in the Idaho Imagery Technical Working Group and the Idaho Geospatial Council. In total, 8 meetings have been held with IdahoView collaborators leading or taking an active role.

- [KS] KansasView representatives Steve Egbert and Kevin Dobbs regularly attended GIS Policy Board meetings through the year and have played an active role in promoting KansasView at the meetings. We maintain contact with key Policy Board members via phone and email throughout the year. This year we were successful in obtaining a new grant from the Policy Board for funding to create additional inundation extent databases which will be of direct benefit to the State Adjutant General Department and the Division of Emergency Management. In addition, we obtained funding from the Policy Board to

assist in georeferencing General Land Office survey maps for the state and for extracting key information from them.

- [LA] LaView is working with organizations across the state involved in geographic data development and usage. These special meetings included:
    1. New Orleans, regarding the impact of the BP oil spill on the gulf coast region,
    2. Baton Rouge and Lake Charles to work with the Southwest Coastal Study Taskforce,
    3. New Orleans and Baton Rouge for meetings with the State Remote Sensing and GIS Committee.

- [MD] We continue to attend the monthly meetings of the Executive Committee of MSGIC, as well as MSGIC's quarterly meetings. One outcome of our involvement with MSGIC was an opportunity to work with staff of the Maryland Environmental Service in developing a procedure to map invasive species using high-resolution (6 inch), 4-band orthophotography.

- [MN] Members of our consortium have been active in contributing to planning for acquisition of statewide data sets.
  Statewide 1-meter orthorectified 4-band data NAIP imagery of Minnesota were acquired in the summer of 2008 under the direction of the Minnesota Geospatial Information Office (a MinnesotaView partner). Three-band natural color imagery was acquired in 2009 and 2010. All data are being distributed at no-cost by MNGeo and are being widely used.
  Statewide LiDAR data acquisition over a several year period is being coordinated by the Minnesota DNR (also a MinnesotaView partner). It is to be completed in the spring of 2012.
  Under the direction of the Minnesota DNR the state is also acquiring high resolution spring leaf-off 4-band imagery in several phases (years) from 2009 - 2015. Its major objective is to support updating the National Wetland Inventory, but the data will be available for use by other projects.

- [NE] We continue to work closely with the **Nebraska GIS Council** (http://nitc.nebraska.gov/gisc/) and its member agencies, comprised of representatives of all levels of government, local through federal, to coordinate the development and application of geospatial information technologies in Nebraska.
  We have been instrumental in developing and guiding the establishment of a statewide geospatial portal (**NEMAP** http://www.nebraskamap.gov) and securing funding for the pilot project.

- [NC] Further strengthened the established connections of NC statewide geo-spatial data committees (e.g., USGS in NC, NC Center for Geographic Information Analysis).

- [PA] PI - Dr. Mueller is a Board Member of Pennsylvania Mapping and Geographic Information Consortium (http://www.pamagic.org/pamagic/site/default.asp).
  He has been selected as the chair of the PA USGS National Hydrography Dataset Committee due to his participation in PaMAGIC. The PA NHD Committee will examine the possibility of using LIDAR to acquire local resolution of NHD data.

- [WV] West Virginia View continued to serve on the West Virginia State GIS Steering Committee.

B. DATA ARCHIVE AND DISTRIBUTION ACTIVITIES (101 total activities)

Develop and Maintain a Remote Sensing Data Archive (44 total activities)

(D-001) 25 StateView members reported progress in developing and maintaining easily-accessible public remote sensing data archives. These archives made access to remote sensing data much easier, resulting in higher rates of data use. Highlights follow.

- [AL] In GY 2010 all Landsat 5 TM scenes with less than 10% cloud cover were downloaded and processed into .img and Geo-Tiff formats. We now have over 1000 Landsat TM images in our database. Students are working on a website which automatically is updated when images are added and that can be queried.

- [AK] AlaskaView currently has a 42TB archive of AVHRR, GOES, DMSP, Landsat, and MODIS archive available freely to the public. In GY 2010 AlaskaView started archiving and distributing the SPOT5 L1A source scenes for the Alaska statewide orthoimagery product. The ortho mosaic products were uplifted by the USGS to allow for inclusion into the new US-TOPO products in Alaska.

  Usage of the WMS (Web Mapping Service) for raster imagery continues its steady growth. The tile interfaces put in front of the WMS interfaces for web map developers to mashup in their own applications continues adoption. Many of the WMS and tile interfaces available from AlaskaView are now integrated into the Arctic ERMA (environmental response management application), a tool to support decision-making for oil spills in Arctic and sub-arctic waters.

- [AR] Through the support of AmericaView and the Center for Advanced Spatial Technologies (CAST), we will continue to make our remote sensor data archive publicly available at no cost. Funds will cover time and costs related to maintaining the archive.

  ArkansasView continued to maintain a web-based, searchable FTP site for Landsat data download. ArkansasView cooperator, the Arkansas Geographic Information Office (AGIO), maintains a comprehensive GIS data archive which includes numerous aerial photography collections.

- [GA] We maintained a GaView web server where members and the public can download remote sensing data freely. Particularly, we added a visitor counter available from http://ClustrMaps.com. In addition, we moved the GaView website from http://www.westga.edu/~gaview to http://gis.westga.edu/gaview. We implemented the new GaView website using DRUPAL CMS.

  [HI] We will continue to make Landsat, ASTER, MSS data available via the HawaiiView implementation of GloVis (http://hawaiiview.higp.hawaii.edu.

  The archive remains online, and provides almost 200 Landsat (TM, ETM+, MSS), and Terra ASTER scenes of the State of Hawaii (the eight main islands and the reefs and atolls that comprise the Papahanaumokuakea Marine National Monument. The website also makes available cloud-free Landsat mosaics and SRTM DEMs of the eight main Hawaiian Islands, as well as some radar data sets of the Big Island.

- [IN] **Maintain IndianaView GloVis as a portal to free remote sensing data for Indiana.**

  We kept the IndianaView GloVis portal up-to-date for all to use to access free remote sensing data for Indiana including that from Landsat Thematic Mapper, Landsat MSS, EO1, ASTER and Corona data along with links to the Indiana ortho data stored at Indiana University and the subscription service to real-time MODIS data. The majority of the image data will be in easy to access GeoTIFF formatted image files with all bands combined into a single file for ease of use. The ASTER data will be in hdf formatted files because it is easier to handle the multi-scale data in this format. One can use an application like MultiSpec to convert subsets of the data to GeoTIFF format if needed. Links will also be available to all of the free Landsat data in the USGS data portals. This activity really represents activity codes D-001, D-002, D-003, D-004 and E003.
  39 new Landsat 5 scenes collected during 2009-2010 were added to the IndianaView GloVis server. The data were processed such that all of the bands are included in one GeoTIFF image file.
  Four free ASTER scenes were added to the GloVis server; they were the only ones available during this period.
  An astronaut image kml file for Indiana was created using the directions that Jay Morgan provided; the file is available from the IndianaView web site.
  Another addition to the server is the USDA National Agricultural Statistics Service (NASS) Crop Data Layers for 2000 through 2010 for Indiana.
  Another set of data that was created for researchers is the MODIS 8-day LAI product for 2008 through 2010 for Indiana; this was done to support a modeling project. This data set will be added to the GloVis server during the next project period in case other researchers may wish to have it.

- [KS] Continued to maintain the KansasView web site including an increased emphasis on their floodplain mapping efforts, including maintaining a portal to permit interactive viewing of the Segmented Library of Inundation Extents (SLIE) database: http://kars.ku.edu/geodata/maps/depth-flood-eastern-kansas/, which was created with support from AmericaView and the GIS Policy Board. This year we continued to leverage these capabilities by adding other interactive map viewing databases, focusing on land cover.

- [LA] LaView works to maintain public accessibility to RS archives through multi portals in the state. RAC UL Lafayette, Atlas LSU, DEQ, NRCS and NWRC to name those in our consortium that are actively archiving and making RS data accessible to the public.

- [MD] A revised MarylandView Web site was launched.

- [MI] MichiganView continued to maintain access to Landsat datafiles that were acquired prior to the USGS' change to providing Landsat datasets for free. NAIP county mosaics from 2005 and 2006 are available on the MichiganView website, and 2010 imagery is available upon request. In addition, the Michigan Tech Research Institute is offering a classification map of submerged aquatic vegetation (SAV) online at www.mtri.org/cladophora. The latest MODIS scenes of Michigan are also still available through MichiganView.org.

- [MN] A unique database of statewide lake clarity data for over 10,500 lakes is available for seven times from 1975 - 2008 at approximately 5-year intervals. We have added the most recent statewide classification of lake clarity for 2008, along with 1975, to the

database and expanded and enhanced the web-based mapping applications, for example, combining land and lakes data into one map.

- [MS] The MSView website has been undergoing a significant upgrade. While the overall look and feel of the site will remain the same, the functionality of the site is being moved to a content management system to simplify the updating and maintenance of the site. When completed in the early spring, many aspects of the site will be able to be managed by non-technical individuals and provide for the routine updating of news events, posters and educational materials.

- [MT] NRIS (Natural Resources Conservation Service)/MT State Library employees and members of MontanaView routinely reviewed and updated the accessible archive collection. Gerry Daumiller and Evan Hammer gave information updates at our regularly scheduled consortium teleconferences in October 2010 and April 2011.

- [NE] Continued to maintain and update the NEView website. As other statewide and national entities now serve much of the data that was unique to NEView, we currently provide links to most imagery, rather than archiving and serving it ourselves.

- [NH] Currently, two members of the New Hampshire View Consortium maintain remote sensing and other geospatial data archives that are publicly accessible. *These are GRANIT and EOS-Webster.* We continued to work with our partners that archive data. In addition, we provided imagery/data to schools as requested. We provided Landsat imagery to two GLOBE schools in New Hampshire during this time period.

- [NC] Continued the development of a remote sensing data clearinghouse with Renaissance Computing Institute (RENCI) at East Carolina University. However, due to the budget cut to the RENCI at the East Carolina University, the server hosted at the RENCI will be off line at the end of FY12 (June 30, 2012). There is no immediate plan whether the server will be online or not after June 30.

- [OH] OhioView's data archive is housed at the OhioLink Library at Miami University. The Library recently underwent massive equipment updates, and a new storage system was purchased to bring the OhioView archive compatible with OhioLink's equipment. The archive is publicly accessible through the ohioview.org website.

- [PA] Dr. Kelly updated the Pennsylvania View and the Chesapeake View websites with new content and designs. She also continued to manage both sites.

- [SD] We added daily MODIS data to the archive until mid-September 2011 and plan to resume the daily downloads in the near future. We are not, however, adding Landsat data to our archive because of its availability via GloVis and Earth Explorer. Both archives are currently unavailable via our website because of website reconstruction mandated by SDSU for all SDSU departments and programs. Reconstruction will hopefully be completed soon. We hope to provide online access to the MODIS archive but will not have online access to the Landsat archive.

- [TX] The TexasView archives continue to be made available to all.

- [WV] Continued to maintain the www.wvview.org website, the largest single source of imagery of West Virginia. The data includes USGS data, as well as other data sets, including lidar. In a major initiative for 2010/2011 West Virginia View is seeking to

partner with the WV DEP to host raw lidar point data (.las files) for approximately 40% of the state.

A major server upgrade was initiated during the reporting period.

- [WI] Posted the 2010 NAIP statewide county mosaic imagery December 7, 2010. Two version of the true color NAIP were produced (one was considered too blue and was corrected). Both versions are hosted by WisconsinView. Two projections of v2 of the NAIP are available for download as well.

  WisconsinView posted the individual 2010 NAIP DOQQs July 8, 2011 (during the no-cost extension period of this reporting period).

- [WY] Continued to maintain its data archive consisting of Landsat, ASTER and MODIS images. These datasets are available to UW research staff, faculty and students. We added several Wyoming Landsat images to our server that were downloaded by UW students for their projects.
  Impact: Though users can download data from USGS websites, they prefer to check with us first for two reasons. 1. Not all Landsat scenes are available for download at the USGS site. Users have to submit an order and depending on the number of requests ahead of them they have to wait for few days to a week before gaining access to the data. 2. They have to pre-process the USGS data while data from our archive are ready to use.

(D-002) 13 StateViews continued making remote sensing data available at low or no cost. Freely accessible data removed a previous barrier to use in education, applied research, resulting in higher use rates and more applications.

- [AL] Upgraded servers to Windows based system made it easier for students to manage the server that AlabamaView.org is on. Website was updated to include 2009 NAIP imagery. Created an ArcGIS online map service with 2009 NAIP imagery.

- [AR] All remote sensing data collected by ArkansasView and its cooperators is provided free of cost through websites maintained by the Center for Advanced Spatial technologies at the University of Arkansas, and from the Arkansas Geographic Information Office (AGIO) GeoStor site.

- [HI] Data are available at no cost.

- [MD] A FTP site was developed on our server to accommodate downloading of Landsat and other geospatial data for Maryland and the Mid-Atlantic region.

- [MI] MichiganView continued to provide LANDSAT and NAIP imagery (present in the existing archive) in a variety of formats for download, free of charge.

- [MT] NRIS (Natural Resources Conservation Service)/MT State Library employees established and reviewed data acquisition process for the public. Gerry Daumiller and Evan Hammer gave information updates at our regularly scheduled consortium teleconferences in October 2010 and April 2011.

- [NE] Continued to provide easy access and free data (Landsat imagery, FSA DOQQs, DRGs) through the NEView website (http://nebraskaview.unl.edu/neview02.php). Imagery on the NEView site continues to be freely accessible, with links to publicly available data updated as needed.

- [OH] OhioView's data archive hardware is housed at the OhioLink Library (Miami University). The archive is openly accessible to the public.

- [TX] TexasView archives continue to be made available to the general public free of charge. Use of the archive has remained steady for many years.

- [WV] With the exception of commercial imagery, all WV View is available at no cost. Interest in the West Virginia View website remains strong, especially for classroom use, because the data is in convenient formats. There are no barriers to access to the data (with the exception of the commercial imagery).

- [WI] Closely related to D-001 and D-004. We continue to provide no-cost imagery. As of 21 March 2011, we had 10,000 unique registered users.

- [WY] Continued to provide existing and new (see WY-D-006 below) Landsat and ASTER data. Students and faculty often check WyView data archive prior to downloading data from the USGS archives (GloVis or Earth Explorer). Only images not available through the WyView archive are downloaded from one of the USGS archives.

  Impact: Same reasons provided for D-001.

(D-003) Six StateViews worked to generate user-friendly formats **(**GeoTIFF, Jpeg and others) to accommodate a wide variety of users. These formats allowed uses of the data by inexperienced users and/or users who do not have access to certain types of software.

- [AL] Complete Landsat 5 archive with less than 10% cloud cover for the state of Alabama was downloaded in GeoTiff format. This was accomplished through an undergraduate student project.

- [AK] Worked to get all their data into WMS services, providing tools that allow users to extract out an AOI in a data format of their choice for offline usage becomes an important feature. AlaskaView created a simple, web based, map extraction tool for WMS feeds. MakeMap is now freely available on GitHub at http://github.com/gina-alaska/makemap. A deployment of the 'makemap' application can be found at http://makemap.alaskamapped.org.

- [HI] Continued to maintain their Landsat and ASTER data archive, some of which is available in Geotiff format.

- [NE] The NEView data archive continued to be made available to users upon request. They advised a number of individuals regarding sources and uses of Landsat and orthoimagery - several University of Nebraska-Lincoln undergraduates, a University of Michigan graduate student, a University of Maryland graduate student, personnel from the Flathead Lake Biological Station in Montana and several staff members of University of Nebraska Extension.

- [WV] West Virginia View continued to maintain a popular county-level series of satellite images of West Virginia. Data is provided of all 55 WV counties in jpg and tiff formats.

- [WY] Converted Landsat (~45 images) downloaded by UW students for their projects and MODIS (8-day composites from 2009 & 2010) images to ERDAS Imagine format and added to the archive.

  Impact: 1. A WyView scholarship recipient used the ready-to-use MODIS images for her internship project from our archive. This step saved her a considerable amount of time required to download and process these images that are provided in HDF format. 2. Also Dr. Matt Kaufmann, USGS Cooperative Unit on campus, had to compute NDVI values for several growing seasons as part of wildlife habitat assessment. His team obtained MODIS images (2000 - 2009) in ERDAS Imagine format for their project, thus saving time and resources needed to download and process these images in HDF format if obtained through the USGS.

Archive Growth (33 total activities)

(D-004) Eight StateViews added new images to their archives through sharing arrangements either within their consortia or among StateViews, resulting in more freely available data for the larger user community.

- [CA] Collaborated with CA Resources Agency to add images to archive.

- [MI] MichiganView continued to harvest MODIS imagery for Michigan received by the MODIS direct receiving station in Madison, Wisconsin and processed by WisconsinView. The current MODIS images (Michigan subsets) are available on the MichiganView homepage, and historical subsets are available here:
  http://apache.mtri.org/modis_images/aqua/modis/
  http://apache.mtri.org/modis_images/terra/modis/

- [NE] Continued to download and archive daily Nebraska MODIS imagery provided by WIView.

- [NH] Continued to add Landsat Thematic Mapper 5 imagery to their state Landsat database as imagery was collected. Other orthophotography and other imagery is added as it becomes available. A new high resolution digital camera data set and lidar imagery is being collected in 2011-12. We will work to help get the word out about this imagery once it has been processed and is available.

- [ND] Continued to process LiDAR data and will place them on our server once we have a replacement server up and running.

- [TX] Texas Today MODIS imagery is collected daily from WisconsinView and added to the TexasView archives. Over 100 new Landsat scenes were added to the TexasView archive to support the Earth Observation Day project. These images are incorporated into K-12 educational outreach being developed by Rebecca Dodge and promoted through Texas Parks and Wildlife and the Texas Regional Educational Service Centers.

- [WI] Closely related to D-001 and D-002: WisconsinView posted the 2010 NAIP statewide county mosaic imagery December, 2010 and the associated DOQQ imagery in July 2011.

  The most important new orthophoto data set hosted by WisconsinView is the WROC (Wisconsin Regional Orthophoto Consortium) statewide 18" leaf-off collection. The WROC is comprised of 45 Wisconsin counties and approximately 70 cities, villages, and towns. This imagery is only available through download at the WisconsinView data portal. It is the highest resolution statewide collection ever to be made available to the public at no cost. The WisconsinView data portal was selected by the consortium of as the best choice for distribution. It went online June 24, 2011 under the no-cost extension of this reporting period.

(D-005) Five StateViews leveraged other projects that purchase data as a source for their archives**.** Leveraging saved limited funding, and resulted in additional freely available data.

- [ID] The Idaho lidar consortium web page was completed (www.idaholidar.org) and continued to be updated with new members/users and datasets. An interactive map displays statewide currently-existing and planned lidar data purchases. Over 60 sets of lidar data are currently displayed. An associated table serves as the information source for the listed datasets. Interested parties and users can contact the point person listed in the table to acquire copies of the data or its status.
  In addition, IdahoView partners Godfrey and Weber are active participants in the NAIP planning and serving via both the INSIDE and ISU TREC web sites. These sites are being linked off the IdahoView web site.

- [IN] Links are available in the IndianaView GloVis portal to the 2010 NAIP data collected over Indiana. These data were purchased by other projects and are being hosted by an IndianaView Consortium member, Indiana University via their Indiana Spatial Data Portal. Another addition has been the Sanborn Historic Maps that are reported on later under the section R-010 task.

- [LA] Worked with other state consortia partners to coordinate imagery acquisition from the Louisiana National Guard and the State Department of Homeland Security. This helps local government bodies such as Iberia Parish with establishing their base network. Imagery acquired is retained by the local geospatial authority at the parish level. These datasets in turn provide the foundations of base imagery for parish planning and emergency response.

(D-006) Six StateViews collected free Landsat, ASTER, MODIS, or other data from existing web sources. Having redundant data available for free can save time and effort for those who primarily access data through StateView archives.

- [AL] 2010 and 2011 MODIS NDVI and LST, and Landsat data was downloaded and processed. These datasets have been used by the Alabama Office of Water Resources to assist in monitoring potential onset of drought.

- [GA] Added ASTER DEM to the GaView data archive (250MB). This is available to the public via the GaView Website.

- [MD] Installed the FTP download software for MODIS data and are building an archive of the data on our server. Their archive includes nearly a year of the daily images for Maryland made available from the University of Wisconsin.

- [MD] Acquired Spring 2011 Landsat 5 imagery for Maryland. The imagery has been georeferenced and clipped for use with other MarylandView Landsat and geospatial data.

- [NE] Continued to identify and collect unique free imagery for the NEView website, but have discontinued downloading data that is readily available from other local and national sites.

- [WY] Added all the Wyoming Landsat images downloaded by UW students (fall 2010 and spring 2011) for their class projects. Imported images were checked for QA/QC issues and were saved as ERDAS Imagine files. During this funding cycle, we downloaded 2009 (second-half) and 2010 MODIS images in HDF format and imported the infrared and red bands and saved them as ERDAS Imagine files.

  Impact: For reasons described in D-001, adding data downloaded by students in a semester will help students and researchers (from that point forward) to save time and resources needed for downloading and processing these data.

(D-007) Thirteen StateViews were involved in hosting data sets for StateView partners. By sharing archives, data is more consolidated and therefore easier to search, browse, and access. Highlights follow.

- [AL] Hosted NAIP, NAPP, DRGs, DEMs, Soils, Landsat, MODIS. We do so in partnership with the Alabama Cooperative Extension System.
  Contributed $1000 to web server for NAIP. We have NAIP data posted and a map service provided and available on the AlabamaView ArcGIS online group.

- AVMSS – Nine StateViews pooled financial and intellectual resources to develop and host a web server that serves a "best available" imagery layer as a WMS and tile service based on technology developed by AlaskaView. The project is now called the AmericaView Multi-State Server (AVMSS). The primary imagery may be from the National Agricultural Imagery Program (NAIP). Long term server hosting will be provided by TexasView. Individual states will be responsible for processing their data into a format that can be used by the web server and developing various products for AV-wide and specific StateView utilization of the server. The participating states are: Alaska, Texas, Wisconsin, Indiana, Michigan, North Dakota, Virginia, Alabama, and Ohio.

  Accomplishments in FY10 The AVMSS core hardware was purchased, put together, and tested by Dayne Broderson (AlaskaView). The hardware worked together as planned. The AV Technology Committee met and agreed upon a drive population plan for the server. The drives were ordered, installed, tested, and configured. Testing of the system in Alaska was cumbersome because of the slow network link. The server was shipped to TexasView to be installed in a long term hosting location.

  The AVMSS was received and installed in the Telecommunications Cold Room on the campus of Stephen F. Austin State University (home to TexasView). It was connected

to the perimeter of the SFASU network with a 1Gbit/sec Ethernet connection to the GigaPop in Houston, Texas, one of two Internet 2 peering points for Texas.

Several AV members from Alaska, Wisconsin and Texas worked to get the infrastructure for this capability set up. It was not completed, however, before the end of the 2010 grant so that "production" data could be made available.

Distribution Software development -- AlaskaView worked to get all their data into WMS services, providing tools that allow users to extract out an AOI in a data format of their choice for offline usage becomes an important feature. AlaskaView created a simple, web based, map extraction tool for WMS feeds. MakeMap is now freely available on GitHub at http://github.com/gina-alaska/makemap
A deployment of the 'MakeMap' application can be found at http://makemap.alaskamapped.org

AlaskaView expanded tile generator and caching support in Shiv for ArcGIS Online tiles and ESRI REST api. Shiv will be integrated into the AVMSS for serving a variety of tile interfaces to the AVMSS WMS interfaces.

Looking Ahead – Testing of the server continues in anticipation of full accessibility by the membership. The project will be continued into grant year FY11.

During the first quarter of 2012 the AVMSS will be setup with DNS and application hosting environments and MakeMap (from AlaskaView) will be deployed to provide a simple map extraction capability from the hosted WMS datasets on the AVMSS.

- [GA] 2010 NAIP imagery (56GB total) over Okefenokee Swamp was added to the GaView data archive. The image covers the Charlton and Ware counties in Georgia. This imagery will be available from the GeorgiaView site.

- [ID] Imagery are being hosted at both the INSIDE and ISU GIS TREC web sites. While the IdahoView webpage (www.idahoview.org) does not host data, it directs users to ISU GIS TREC webpage and INSIDE, Idaho's main geospatial data repository. Our web metrics indicate that the links to aerial, Landsat, and MODIS data collectively had 591 visits. In addition, ISU GIS TREC webpage had 266 data downloads.
Similar to IdahoView webpage, Idaho lidar consortium webpage (www.idaholidar.org) does not host lidar data, but directs users to the institution/people who purchased the currently available or planned lidar data. The Idaho lidar consortium webpage was restructured and redesigned in July 2011. Between July 2011-Dec 2011, this webpage had 2590 total visits.

- [IA] IowaView hostsed 100% Lidar cover for the entire state (roughly 10 terabytes). It is available at http://www.geotree.uni.edu/LidarProject.aspx. This data was collected by the State of Iowa.

- [IA] IowaView hosted aerial photo imagery acquired by the State of Iowa.
The imagery is available at http://www.geotree.uni.edu/LidarProjecspx

- [WI] WisconsinView Hosted new NAIP Imagery, USGS/NGA 133-Cities Imagery, and WI-DNR Ortho photos as it was received from Federal and State agencies

[This activity is essentially redundant with activities D-004 and will be combined in future RCAs and reporting.]

[WI] AVMSS- WisconsinView proceeded with development of interfaces for testing (using other funds outside of AmericaView). Once the AmericaView system is up and running at TexasView, we will test AmericaView mapservices in their interfaces using AmericaView funding (for time and effort).

(D-008) One StateViews brokered data purchases. Brokering data purchases leveraged funding and resulted in additional freely available data.

- [ID] Hired an IT specialist to develop and maintain a web interface at www.idahoview.org that connects users interested in remote sensing data to various data repositories with remote sensing data including NAIP and Landsat. IdahoView and the Idaho lidar consortium did not have the funds necessary to host a data repository. We felt that directing users to the already existing data sources was a more efficient use of funds and resources.

(D-009) Two StateViews developed a simple html map-interface to help users find data for their area of interest.

- [ID] The html interface has been implemented. Idaho lidar consortium webpage now displays currently available and planned lidar data across the state in an interactive map.

- [WY] Exported the footprint of *more than 1600 ASTER scenes for Wyoming* to a shapefile (ESRI) and grouped them by year. So users can download a shapefile by year and view their geographic footprint in ArcGIS, ERDAS, or any other geospatial software. Image acquisition date and their ID are stored as attribute data.

Ground Station or Airborne Operations (16 total activities)

(D-012) Four StateViews were involved in activities to receive, capture, process, and distribute satellite or airborne data. These partnerships strengthened the StateView consortia and helped to maintain critically important knowledge with the larger AV consortium.

- [AK] UAF/GINA/AlaskaView added dozens of new images daily to its free archives through X- and L-band ground station operations. The AlaskaView/GINA partnership with NOAA/NESDIS Fairbanks Command & Data Acquisition station continued to supplement coverage of MODIS and AVHRR and provided expanded access to DMSP and Landsat. The archive continues to get daily use by users throughout the world.

- [AK] UAF/GINA/AlaskaView partnered in the capture of Landsat 5 data for Alaska. In a three party partnership, the NOAA/NESDIS Fairbanks Command and Data Acquisition Station captured Landsat 5 data in the summer season of 2010; UAF/GINA/AlaskaView transferred the data to USGS/EROS where it was processed and archived. Additionally, NOAA/NESDIS/FCDAS worked in partnership with UAF/GINA/AlaskaView to capture,

process and distribute additional satellite data, including DMSP, AVHRR, and MODIS. End users include weather forecasters, emergency responders, marine users, and scientists in support of field operations.
The proven success of this partnership and infrastructure act as the foundation for a partnership between NOAA, AlaskaView/GINA, and USGS/EROS for continued support of the LDCM activities.

- [IN] IndianaView maintained the near real-time MODIS and GOES data from the Purdue Terrestrial Observatory that is currently available via the subscription service named PRESTIGE. The web link to the service is: http://www.purdue.teragrid.org/prestige. Additions were made to the service to allow nearly full Conterminous US coverage for near real-time Enhanced Vegetation Index (EVI), Land Surface Temperature (LST), and AMSR-E Soil Moisture and AMSR-E Vegetation Water Content image data products for a West Nile Virus research activity directed by Dr. Sugumaran (IowaView).

- [WI] Continued to collect daily MODIS imagery from Aqua and Terra through their Direct Reception Facility at UW Madison. Created a new 16-day rolling composite (BRDF) cloud-free 500m true-color GeoTIFF product. The continental product is available for viewing online in Google Maps here: http://wms.ssec.wisc.edu/gmaps/?products=BRDF

  However, the idea of cutting the image into individual state components is being reevaluated in lieu of a more desirable approach of producing GeoTIFFs from bounding boxes requested as part of a WMS map request.

(D-013) One StateView was involved in activities to develop near real-time collaborations with emergency responders. These activities are increasingly important as the number of natural and man-made disasters appears to be rising in intensity and in terms of economic impacts.

- [AK] UAF/GINA/AlaskaView operated two ground stations and provided data in near-real-time to users such as the USGS/UAF/DGGS Alaska Volcano Observatory and BLM Alaska Fire Service. AlaskaView/GINA is now feeding satellite derived product feeds to the National Weather Service offices in Alaska.

(D-014) One StateView was involved in developing near real-time data collaborations in support of field operations. This collaborations strengthened StateView consortia and added depth and experience to the larger AmericaView consortium.

- [VT] Vermonters awoke on August 29th, 2011 to some of the worst devastation that the state had experienced in over a century. Heavy flooding in the Waterbury state office complex took the state's key geographic information resources offline at a time when federal, state, and local emergency personnel needed access to the data. VermontView quickly stepped in to coordinate all geographic information activities under the direction of VermontView PI, Jarlath O'Neil-Dunne. By mid-morning on the 29th VermontView had a mirror data download site that provided FEMA and other federal agencies with access to Vermont's robust set of GIS data. VermontView personnel participated on the daily calls to coordinate satellite imagery that was being acquired through the International Charter. Over the course of the week following Irene, VermontView downloaded, processed, and distributed over 300 satellite images to state and local agencies. VermontView coordinated student volunteers at the University of Vermont, producing the

first satellite-derived flooding maps for the state. Leveraging the robust IT infrastructure at the University of Vermont, VermontView served as a virtual clearing hub for data produced by FEMA and NGA, and downloading data to media and transporting it to the temporary Emergency Operations Center (EOC) in Burlington. Once the Vermont Center for Geographic Information (VCGI) had resumed operations, VermontView facilitated an orderly transfer of all data products and worked with VCGI to train state and local personnel on the data products use.

- [WY] Dr. Sivanpillai served as the International Charter on Emergency and Disaster Response's Project Manager for the 2011 Midwestern Floods. This project started in late April 2011 (between Cairo, IL and New Madrid, MO) and expanded to include KY, TN, AR, and LA (along the Mississippi River). For this project he coordinated with numerous Federal, State, and local government agency personnel in these states and satellite data vendors in Germany, Italy, Canada, and the US. Initially this was projected as 10-day task but was completed in July 2011(four months later) because of the extensive flooding downstream.

  This was both a great learning and rewarding experience for the WyView PI to help personnel in 5 different states, from two different locations (Laramie, USA and Coimbatore, India).

Collect Metrics about Data Distribution (16 total activities)

(D-015) Seven StateViews maintained or improved their ability track the number of visitors and page views per month and per reporting period through installing or configuring a mechanism for reading web access logs for tracking web usage. Tracking web traffic provides useful information on the number of users and can be used to track changes in archive access over time.

- [AK] The primary AlaskaView/GINA website received approximately 1,463 visitors per month generating approximately 2,781 page views per month.

- [CO] ColoradoView used Google Analytics and services provided by the web hosting company. Web visitation has been low, with less than 200 visitors during the past 6 months. A new web site was rolled-out in midsummer to coincide with articles and news releases announcing the site. We hope to see a dramatic increase in web site visits.

- [IN] The Purdue web server administrators use Google's Urchin web site analyzer to report various web site statistics. The average number of visits and page views for the IndianaView web site for the October 1, 2010 to June 30, 2011 time period were 1555 and 1903 per month respectively. The way the page views number is determined now differs from the way it was done in previous reports; the number is now significantly lower. There were 2025 downloads of the 20 fact sheets from the IndianaView web site.

- [MD] MarylandView continued to track the usage of its Web site using Statcounter and incorporated Google Analytics into the revised MarylandView Web site.

  1. Total Landsat data downloaded (GB): **31**
  2. Total MODIS data downloaded (GB): **0**
  3. Total orthophoto data downloaded (GB): **0**
  4. Total other data downloaded (GB): 28

- [MT] Has recorded the basic website statistics and prepared the statistics for reporting:
    1. Number of website visitors **2,912**
    2. Number of web page views **11,448**

- [OH] We are using Google Analytics, but have found it difficult to work with so are exploring other options to better track web usage.

- [WV] The FastStats web log analysis program was used successfully for the last report on the West Virginia View web site metrics.

    1. Total number of visitors: **762**
    2. Total number of page views: **3,286**

(D-016) Six StateViews collected information on the volume of data downloaded (number of scenes and number of Gigabytes of data), and the type of data downloaded (Landsat or air photo, etc.). Information on the volume and type of data provides insight into how the data are being used.

- [AK] UAF/GINA/AlaskaView continued to collect basic data download statistics: - Volume of data downloaded (number of scenes and number of Gigabytes of data) - Type of data downloaded (Landsat or air photo, etc.):
    - Over 3,040 downloads of high resolution (2.5m or better) scenes from the AlaskaMapped browse archive.
    - WMS (real-time datasets and base maps): Over 700 users have done over 700GB of traffic during the reporting period.
    - WCS (elevation datasets primarily): Over 100 users have done approximately 25GB of traffic during the reporting period.

- [MD] Tracks data downloads from the MarylandView Web Site. The results are used to assess trends in data access over time.

- [MT] Continued to record volume and type of data downloaded and prepared for statistics for reporting:
    1. Total remote sensing data archived in our StateView website (GB) **196**
    2. Remote sensing data newly added in this reporting period (GB) **0**
    3. How much Landsat data did users download from the Website (GB)? **101**
    4. How much other data did users download from the Website (GB)? **1**

- [WV] The FastStats program was used successfully to provide web site metrics for the last AV report. The results are used to assess trends in data access over time.

- [WI] Continued to collect and map user metrics for WisconsinView's registered data users (9,069 as of 5/18/2010, and 9,879 as of 2/15/2011). Results will be grouped by congressional district for reporting to congressional staff as in previous years.

- [WY] Continued to report data usage and download statistics - since this information is valuable during our Congressional Outreach and other promotional meetings.

Only UW students and researchers are downloading data from WyView archive for their research projects.

- Total remote sensing data downloaded (GB): **42**
- Total Landsat data downloaded (GB): **28**
- Total MODIS data downloaded (GB): **14**

(D-017) Two StateViews developed a web-form, php/MySQL database, or other method to collect user type, organization type, user e-mail, and Zip code. These types of user data are very valuable as a means to better understand the data user community, ultimately to improve StateView data archives.

- [AK] The University users continue to be the heaviest users of AlaskaView services (data usage/hits) but only represent a small fraction of the users of the AlaskaView web services (WMS/WCS). The majority of users of the web services are from unknown (coming from Alaska or lower 48 ISPs) which means the general community outside of Sate and Federal organizations continue to adopt the services.
  For registered user data downloads during the reporting period:

  Top industries

industry	num scenes
UNIVERSITY	226
GENERAL	150
COMMERCIAL	145
STATE	65
NONPROFIT	22
FEDERAL	21
OTHER	5
LOCAL	4

(D-018) Two StateViews were involved in requesting web metrics and developing protocols for collecting referral and data download statistics from an external hosting entity. This information is useful in tracking annual web site use and changes in use over time.

- [ID] Both IdahoView and Idaho lidar consortium webpages have undergone major restructuring and redesign this year. Since then, we have been able to gather web access and data link statistics.

  - Total number of visitors: **662**
  - Total number of page views: **28,569**

- [OH] Used OhioLink.

  1. Total number of visitors: **3,651**
  2. Total number of page views: **1,293,653**
  3. Total remote sensing data archived (GB): **1,500**
  4. Total remote sensing data newly added (GB): **0**
  5. Total remote sensing data downloaded (GB): **1,686**

     Total Landsat data downloaded (GB): **1,025**

Total MODIS data downloaded (GB): **0**
Total orthophoto data downloaded (GB): **47**
Total other data downloaded (GB): **614**

C. EDUCATION ACTIVITIES (99 total activities)

Support Additional Remote Sensing Courses and Resources (29 total activities)

(E-001) StateViews engaged in two activities that shared software licenses among academic member institutions within their respective states to support remote sensing courses and research. Sharing arrangements facilitated the availability of remote sensing laboratory instruction in colleges and universities that would not otherwise be able to offer these valuable experiences. Highlights follow.

- [ND] Purchased a 30-seat HEAK license from Leica Geosystems for ERDAS IMAGINE to be shared by NDView's education members. They shared with Space Studies, Geology, and Biology. They also shared their licenses with Turtle Mountain Community College.

- [PA] Dr. Mueller created a new course called Remote sensing of the Environment is now an official course at California University of Pennsylvania and is also a general education course under Technology Literacy. The class will be taught for the first time this Spring and has 42 students in it. This course will be the first general Remote sensing course taught at the university in 8 years. The past remote sensing course was revised for Meteorology students and required several prerequisites.

- [WV] **Share software licenses for image processing software and install it in a central server**
  See C007
  Sharing licenses has had a major impact in the state. Imagine licenses are now available for all partner educational institutions, and thus has significantly raised the potential of remote sensing education in the state. In addition, by sharing licenses from a central, we have saved a large amount of money by buying fewer licenses, and from a volume discount.

(E-002) StateViews engaged in eight activities that shared course materials developed at one university with others. Shared materials saved valuable time and effort, strengthened existing course offerings, and may have led to the development of new courses that would not otherwise be possible. Highlights follow.

- [GA] Shared remote sensing course material through the http://www.avuniv.org Website which hosts online remote sensing tutorial. Materials such as new exam questions, exercise material and others are shared. J.B. Sharma shared an "Intro. to eCognition" Laboratory activity with the AV GEOBIA interest group. He also shared his lab manual (Image Classification using eCognition8) with AmericaView members, particularly with Luke Marzen in AlabamaView on 2/1/2011.

- [ID] IdahoView's webpage was altered to include a full list of remote sensing resources available around the state under a new tab "Resources". The Resources link on their webpage now includes a list of remote sensing faculty and remote sensing courses offered around the state both live and via Distance Learning. In addition, they now also include K-12 remote sensing-related teaching materials that our graduate and undergraduate students developed through various projects. This page will continue to be updated as we develop more training materials.

- [NE] NEView continued, through their listserv, to share course outlines and lab exercises, upon request, with other members of the NEView consortium. NEView also shared Introduction to GIS course materials with Dr. Russell Souchek of Doane College in Crete, NE.

- [OH] Continued to pursue development of the OhioView "Virtual University." University of Akron and Cleveland State University offer several courses collaboratively (see C-010).
.
- [PA] Dr. Mueller converted three *PG – STEAMER lessons to* ENVI based lessons and tested them with several students. They only rated the lessons as okay, but felt ENVI was a little confusing. Dr. Mueller will be revising them and incorporating them into his remote sensing class this spring along with lessons using Multi-Spec. Dr. Mueller does not foresee any further work on ENVI as he has been told that the software grant that paid for ENVI will probably not be renewed, so Dr. Mueller will now focus on using Multi-Spec.

- [PA] Dr. Mueller is still trying to fully understand OBIA and especially eCognition. The steep learning curve has caused a delay in his proposed project of creating one or two eCognition lessons using Pennsylvania data, so he recently attended an on – line workshop using personal funds. He hopes to have this project completed by June 2012.

- [WV] WVU laboratory instruction material was made available without restriction to our partner institutions. This is an important companion to the state-wide Imagine license agreement, and has resulted in the teaching of remote sensing laboratory work at Marshall University.

(E-003) StateViews were involved in 10 activities to utilize data from StateView archives for teaching purposes. Using data for teaching purposes strengthened course content and built processing and analysis skills. Highlights follow.

- [AR] Dr. Jason Tullis routinely utilized remote sensor datasets from the ArkansasView archive in his classes. Between September 2010 and September 2011, Dr. Tullis created a new exercise titled "Interpretation of Topographic LIDAR Returns" and developed Python code for a new exercise to be titled "High Spatial Resolution Image Interpretation" for use in Principles of Remote Sensing. These lessons are available to the public at http://goo.gl/QgPTY or through the ArkansasView page. Using a new server purchased in part with AmericaView funds, Dr. Tullis setup a remote sensor archive for access by students from Principles of Remote Sensing, GIScience in Biogeography, Vector GIS, and Remote Sensing of Natural Resources; this improved the workflow for 15 existing laboratory assignments.

  Brooks Pearson of the University of Central Arkansas (Conway) used the archive to

download Landsat scenes for college classes in UCA's Department of Geography; Mary Sue Passe-Smith, also from UCA, downloaded Landsat scenes; Bruce Gorham, ArkansasView program coordinator, is using Landsat imagery from the archive in his eCognition workshops.

- [CA] Undergraduate students acquired NAIP imagery for the annual UC Davis community outreach event in April. The PI is offering the 'Environmental Remote Sensing' undergraduate and graduate class in the Spring of 2011 and Winter 2012 utilizing remote sensing imagery and data. A junior high school class of 18 students is working with Landsat imagery in their art class, 11 high school students use Landsat data in a University mentoring program.

- [GA] UWG, GSC and KSU actively engaged the archived datasets in their remote sensing curriculums. Dr. Seong, for example, used the datasets for GEOG3563 Remote Sensing and GEOG4753 Advanced GIS and Spatial Analysis during fall 2010. Dr. Patterson also used MichiganView datasets to write a manuscript for the GeoCarto journal. J.B. Sharma's Remote Sensing course GISC4350K and Digital Image Processing Course GISC4360K used GA View imagery in the laboratory exercises and in some of the student projects.
  Dr. Seong used airphotos and Landsat imagery in his GEOG4562/5562 Airphoto Interpretation and Photogrammetry courses in May 2011. Eleven students used GaView datasets.

- [ID] The Idaho Lidar consortium made their Lidar datasets available for teaching purposes and developed training courses for lidar processing.
  The Idaho lidar consortium webpage now has an interactive map that shows existing and planned lidar data sets around the state. Associated with the interactive map is a table of metadata about lidar acquisition and contact persons. Glenn organized lidar processing training workshop in summer 2011 using some of the data. Further, the Idaho lidar consortium webpage has an open-source lidar processing toolkit that can be freely downloaded by users. Also for educational purposes, they made all of their lidar-related research manuscripts freely downloadable from this webpage. These activities helped meet IdahoView's goal of utilizing data from StateView archives for teaching purposes.

- [MD] Developed a hack to create a KML file of NASA's astronaut photography data. The hack enables teachers and their students to easily display these data for Maryland. The MDView PI completed documentation and disseminated instructions to AV members. Since this hack was developed (and documentation prepared), it has been further refined and used to develop similar KML files for other states. The work of Kevin Czajkowski's students to create these files is of particular note.

- [MT] Professors Rick Lawrence, Anna Klene, and Xiaobing Zhou have all used data from the StateView archive in their remote sensing and other geospatial courses at Montana State University, University of MT, and Montana Tech respectively. They also encouraged using the data archive for research applications.
  During the spring semester 2011, Professor Anna Klene met with the GIS Committee from the U of MT and discussed the use of the MontanaView state archive for teaching purposes.
  Van Shelhamer, Professor Emeritus, with GeoEssentials encouraged the use of remote sensing data and resources available through MontanaView at U of MT Western in Dillon, MT during his 2011 spring semester GIS course to 17 students. Additionally, he

encouraged the use of the MontanaView data archive to participants in the June '11 Remote Sensing Teacher Institute. Finally he promoted the data archive through Geospatial Notes which is a monthly newsletter that is sent to approximately 50 active middle and high school teachers incorporating geospatial science lessons into their classes.

[OH] Ongoing research projects at the University of Toledo, Bowling Green State University, Cleveland State and Central State are using OhioView archive data.

- [SD] SDView data continues to be used in several courses at South Dakota State University including Remote Sensing, GIS and Introductory Soil Science. Because of the current website situation described above (E-001), website access to the archive has been unavailable. Students and instructors, however, are accessing Landsat and other remote sensing data via GloVis and EarthExplorer.

- [TX] Work continued on the TexasView State Park Web Application better known as the TexasView EODay site. The Web App features Texas imagery, land cover and physiology tied to Texas State Parks. Students can see what different parts of the state look like by viewing imagery and visiting state park websites published by Texas Parks and Wildlife. Among enhancements added during this performance period are: A multi-temporal MODIS viewer allowing students to investigate seasonal changes as viewed from space; multi-temporal Landsat imagery for detailed observation over individual parks; layer transparency options; enhanced layer selection capability, and links to Texas Parks and Wildlife and other web resources. Rebecca Dodge is working with Texas Regional Education Service Centers to develop K-12 curriculum consistent with Texas Essential Knowledge and Skills (TEKS). Dodge has been asked to present a four-hour training seminar for teachers in February to introduce them to the use of remote sensing data in the classroom. The TexasView EODay site can be accessed at http://arcgis03.crgsc.org/eoday.

- [WV] West Virginia View-hosted Landsat data was used by six students of the Geog/Geol 755 class at West Virginia View for their class projects. The archive is also used by graduate students in their research.

(E-004) StateView were involved in four activities to fund a remote sensing short course. Short courses provided professionals with a quality educational experience in a limited time-frame, and allowed them to efficiently maximize their time and effort. Highlights follow.

- [ID] Idaho State University's Weber also taught a remote sensing workshop to nine students in July 2011.

- [LA] LouisianaView has, since spring 2002, sponsored, along with the USGS National Wetlands Research Center a workshop, entitled: 2011 Louisiana Hurricane Season National and Local Geospatial/Imagery Data Availability: Data Mining Workshop. This workshop, held June 23, 2011, was free and attended by 45 local and state government, private agencies and educators interested or working in emergency response. We hold this each year prior to Hurricane Season on the Gulf Coast with presentations by Federal and State Agencies working in Emergency Response data archive, acquisition, and distribution.

LaView also co-sponsored a workshop on Synthetic Aperture Radar (SAR) in conjunction with the USGS NWRC on September 6-9, 2010. Four instructors presented the workshop to 25 attendees.

[PA] Pennsylvania View hosted a GeoMapApp Education Workshop at California University of Pennsylvania on February 24, 2011. At the workshop, a GeoMapApp team member presented data in the program which include topography and bathymetry. There were members of Pennsylvania View, Virginia View and Maryland View, 2 Education students, and 2 Pennsylvania teachers in attendance (14 total). Those teachers impact about 60 students every year. The teachers are new to the PA View community and the other 2 education students are now teachers themselves. PennsylvaniaView is hoping to partner with these teachers on future projects.

- [TX] TexasView sponsored the TexasView Fundamentals of Image Processing workshop on October 25, 2010 during the Texas GIS Forum. The class, created and conducted by Teresa Howard with the University of Texas Center for Space Research, was attended by 15 GIS professionals, representing Marathon Oil, URS Corporation, Coast & Harbor Engineering, Stabilix Corporation, Blanton & Associates, Del Mar College, Texas Department of Transportation, Texas Water Development Board, Texas Parks and Wildlife, and Texas Commission on Environmental Quality. The workshop, which has been taught for several years during the Forum, has been updated with new exercises and workbooks to coincide with ERDAS Imagine 2010 and incorporates new data sources. An ERDAS representative attended the training as an observer and presented participants with evaluation copies of the software. Attendees also received a CD of data and a hard cover binder containing class material and exercises.

(E-005) StateViews were involved in four activities to delivered guest lectures on remote sensing for non-remote sensing classes and workshops to promote the utility of remote sensing within other disciplines. These lectures provided an important outreach element to non-geospatial disciplines, informing the audience about the benefits of remote sensing in a variety of disciplines. Highlights follow.

- [ID] The IdahoView PI (Gessler) delivered 8 guest lectures to a variety of constituents including computer science students, college of Natural Resources students, and regional agricultural stakeholder groups. The broader collaborators have also given lectures at their respective institutions promoting the development of IdahoView as a collaboration site for information regarding remote sensing in Idaho. Seven GPS classes were conducted in north Idaho with approximately 25 participants in each class. IdahoView was featured as a resource for access regarding image information for the state and region. In addition, Idaho State University's undergraduate student Carol Moore gave a presentation about AmericaView/IdahoView at the World GIS Day event at ISU, which was attended by ~200 people.

- [IA] One presentation has been given during this period:
  * Sugumaran, R. 2011. Iowa LiDAR Mapping, "March 25, 2011, Iowa State University, Ames, IA
  Three national level conference presentations were also given during this period.

- [NH] The NHView Director presented three lectures during the Fall of 2010 on remote sensing and geospatial technologies to classes at the University of New Hampshire.

Two lectures were presented on Basic Remote Sensing Technologies and Digital Remote Sensing to an Introductory Natural Resource class of approximately 80 students.
The third lecture was on Remote Sensing and Geospatial Technologies as part of graduate Research Methods class with approximately 20 students.

In addition, the NHView Director was an invited seminar speaker in the Department of Natural Resources and the Environment at the University of Connecticut in December of 2010. He participated in a senior seminar course taught by the department chair and then provided an hour seminar on using remotely sensed imagery for land cover mapping in New Zealand. Approximately 100 were in attendance for the seminar.

- [WY]
  Sivanpillai R, Introduction to remote sensing and GIS (Sivanpillai, R). Guest lecture presented in ESS1000: Wyoming in the Earth System on November 3, 2010. Laramie.
  Sivanpillai R, Remote Sensing for Renewable Resources: Accomplishments and Challenges. Seminar presented at the UW Renewable Resources Department on November 19, 2010. Laramie.
  Sivanpillai R, Remotely Sensed Data for Monitoring Agricultural & Natural Resources. Invited lecture presented in AECL4990: Agroecology Capstone Senior Seminar on March 3, 2011. Laramie.

  Sivanpillai R, Remote Sensing Data for Monitoring Weed and Pest Damage. Talk presented at the 7th Annual University of Wyoming Entomology Short Course on March 15, 2011. Laramie.
  Sivanpillai R, What GIS Professionals Need to Know About Remote Sensing? Invited lecture presented in GEOG 4210: Advanced GIS on April 21, 2011. Laramie.

  Outcomes: Faculty in other departments on campus are inviting Dr. Sivanpillai to discuss opportunities for incorporating remotely sensed data in their research. Also they are encouraging their graduate students to incorporate remote sensing in their thesis/dissertation research.

Training Programs for Current Workforce (21 total activities)

(E-007) StateViews were involved in eight activities that prepared and delivered short courses for government agencies, private companies, extension agents, private citizens, and students. Short courses provided professionals with a quality educational experience in a limited time-frame, allowing them to efficiently maximize their time and effort. Highlights follow.

- [AK] The AlaskaView/EPRS lab continued to provide the best remote sensing/GIS training environment in the University of Alaska system. In addition to normal semester class support the lab also provided day long or week long courses for basic to advanced ESRI training and SAR tools training.
  Short courses are being prepared to train users on how to operate the tools and apply the methods AlaskaView uses internally and in cooperation with other members on the Multi-State-Server project. AlaskaView plans to host half day training sessions for AlaskaView users and interested AmericaView members on basics of data management, manipulation, for the toolsets deployed on the Multi-State-Server this

coming spring and summer.

- [AR] Bruce Gorham developed, and is adding to, an Introduction to Geo-Object-Based Image Analysis" workshop. The post-course participant survey is in the development phase.

- [GA] Dr. Seong delivered a workshop to the Georgia Department of Transportation during 12/13 - 12/17 in 2010. Six people attended.

- [ID] A lidar training course was offered for the first time at the annual NSF EPSCOR meeting in Boise during September, 2010. This was attended by approximately 15 students.

- [IA] IowaView had several meetings with their state partners regarding the LiDAR advanced processing options on our website. They are currently developing lidar data processing tools.

- [KY] One mini-grant was awarded for approximately $3,500 to support a geospatial science and technology workshop for K-12 teachers ("GIS/Project Learning Tree Workshop") for a mix of 15 formal and informal K-12 educators. The workshop director estimated that the formal educators impact approximately 100 students per year, while the informal educators impact about 300-350 students per year. The workshop director also noted that "two of the nonformal educators also work directly with teachers, usually about 30 per year that they would engage in the classroom with an average of 23 students per classroom."

- [LA] LouisianaView developed and/or offered 15 continuing education courses during the 2010/2011 timeframe of this grant award, working with ESRI (GIS)(68), Trimble (GPS)(36), Data Mining-Natural Disaster(45), SAR data(20) and Intro. and Advanced remote sensing for Wetland Identification with the USGS(48), for classes to the public. Numbers for individuals taught for each subject covered are in parentheses (). Total for Individuals taught through the LaView sponsored courses is approximately 217. The participants for these courses range from Local, State and Federal government, first responders, private consulting firms, universities and state school systems.

- [NH] The NHView Director taught a full day workshop on Assessing the Accuracy of Remotely Sensed Data at the invitation of the NOAA National Estuarine Research Reserve (NERR) staff outside Seattle, Washington on February 28, 2011. There were 35 staff members from NERR from various Research Reserves all over the US in attendance.

(E-008) StateViews engaged in six activities to provide ongoing support to government agency and other personnel, including those trained in workshops, via telephone, e-mails etc. Ongoing support is critical to a large segment of the non-remote sensing professional community, and can make the difference between using remote sensing data and technologies successfully, or not using them at all. Highlights follow.

- [ID] All IdahoView collaborators continued to provide advice to constituents both through the courses that they offer on campus, the training courses offered for GPS and lidar, as

well as through various stakeholder meetings that are connected to large project initiatives such as NSF EPSCOR and USDA CAP grant activities.

- [MS] UGMC/MSView personnel continued to support the GIS and Remote Sensing needs of the state of Mississippi. This included fielding questions regarding the use and application of the technology as well as researchers with state and local officials seeking assistance with various projects. In addition to technical support, UMGC/MSView loans GPS and other center equipment to local researchers.

- [MT] Van Shelhamer (MontanaView member and trainer) continued to write the 'Geospatial Notes', a geospatial information and newsletter update, and has been emailing it on a monthly basis to participants/teachers that have taken one of our workshops. Currently there are 50 Montana teachers on the mailing list as well as 6 other out-of-state higher education professionals.

  [NE] Continued to serve as the main point of contact for many government agencies, private companies, extension agents, private citizens and students who are looking for spatial data or have questions about using geospatial data.

  From Sept 30, 2010 to January 25, 2011, six requests for data and/or imagery information were fulfilled.
  - The Nebraska Dept. of Natural Resources requested information on statewide cadastral data and historical imagery (2 separate requests);
  - a student from the University of Michigan was looking for DOQQs of south central NE for a PhD proposal;
  - Axxion Administration LLC (Dallas, TX) were looking for statewide cadastral data;
  - the NE Army National Guard contacted NEView for information about statewide historical imagery from the 1930s and 1940s;
  - and the BLM (Northeast Field Office) were seeking DOQQs for the state of Iowa.

  From January 26th to June 30th NEView provided:
  - Orthoimagery of Nebraska to a Law Office in Lincoln, NE
  - NDVI images of south-central Nebraska to an agricultural producer (through a county extension educator)
  - The Nebraska Landcover Map to the Flatwater Group, a private engineering consulting firm in Lincoln, NE
  - Nebraska Landuse Map (center pivot data) to the Nebraska Conservation & Survey Division

- [SD] Provided assistance to several organizations and groups during this grant period. Assistance included working with LiDAR data for a Civil Engineering professor and his student, obtaining AWiFS data and a SD crop data layer for a Plant Science graduate student, creating a 3D NAIP view of a proposed cow/calf unit for an Ag Engineering professor and his student, and providing geospatial technology lectures for an Intro to Ag Engineering class and two Civil Engineering Surveying classes. On several occasions they also disseminated geospatial technology information of interest to the K-12 community via our e-mail distribution list. Their GPS loaner sets have been used by teachers in two school districts, by a Boy Scout troop, and by SDSU faculty members.

(E-009) StateViews were involved in seven activities to develop web-based tutorials FAQs, and “how-to” materials. These tutorials were critically important as aids in

circumventing technology (software) and analysis barriers for many non-technical users. Highlights follow.

- [CO] ColoradoView interns developed two step by step tutorials:
  1) How to Bring Landsat Data into ArcGIS, Mosaic and Clip Scenes using ArcGIS (9.3.1); and 2) Acquiring Landsat Data From the USGS Global Visualization (GLOVIS) Website: Making a Coverage of Colorado. The tutorials provide step by step instructions with ample written and visual documentation and are posted on the ColoradoView website.

- [IN] Much effort was put into revising the MultiSpec Reference manual during this reporting period. The update was made available with the 7.28.2011 release of the MultiSpec application; this was the first major revision in the manual in several years. Also in response to many requests for the hyperspectral data sets that we have, a web page was added to the MultiSpec web site so that interested users can go to one place to download these data sets for their research. The data sets include AVIRIS and HYDICE image data along with ground reference information.

  [MI] MichiganView began developing a tutorial for processing 4-band NAIP quarter quad imagery (GeoTIFF) into a suitable format for a WMS server. An initial draft tutorial was created on MTRI's internal wiki. The intention was to complete the tutorial by tailoring it to processing data for the multi-state imagery server once it was available online, but the server was not made available during the FY2010 period.

- [MN] Joe Knight led the reconstitution and updating of the online Remote Sensing Core Curriculum (RSSC) with redesign of the website. Accomplishments this year include: (1) Created a site template and reworked main RSCC pages with a new template to enforce standards compliance and have a consistent look and feel. (2) Created a new Student Project section to archive projects from various remote sensing courses. The goal is to provide remote sensing students and faculty with a resource to plan and execute class projects. (3) Solicited participation from ASPRS Remote Sensing Application Division members to contribute to RSCC. Little fruit from those efforts is evident as yet; more work is needed.

  Two fact sheets on land cover classification and monitoring lake water clarity were developed. The lake monitoring fact sheet was provided to USGS via AmericaView.

- [NE] Added a description and link to IAView's Web-based Interactive Digital Image Classification tutorial.

- [ND] Several labs using ERDAS IMAGINE version 10 were written by Dr. Rundquist, provided to AmericaView, and placed on the AmericaView web site for AV-wide sharing. Dr. Rundquist is working to update those labs for ERDAS IMAGINE 2011.

(E-011) StateViews were involved in one activity that developed hands-on internship opportunities for students. Internships offered invaluable learning experiences for students and often supported a critical remote sensing need in partner agencies and organizations. Highlights follow.

[GA] The Center for Remote Sensing and Mapping Science at University of Georgia supported two undergraduate students and the $5,000 mini-grant to Gainesville State College supported undergraduate students. Dr. Seong (University of West Georgia) supported Lenard Smith's internship with Atlanta Regional Commission, and the Atlanta MPO.
GaView values this activity very highly. Considering many jobs require experience, GeorgiaView can be an incubator for the future workforce.

(E-012) StateViews were involved in three activities that funded stipends/scholarships to encourage students to pursue remote sensing components of their education. Because many students experience financial challenges, stipends and scholarships often fill a critical need in their remote sensing educations. Highlights follow.

[WV] Provided support to one WVU undergraduate female geology student to present her remote sensing research at a conference.
In addition, WV View has leveraged funding from the ASPRS Potomac Region to support the WVU ASPRS Student Forum, a student remote sensing club. The club had 20 members during the reporting year.
One geography graduate student was supported to attend an ISPRS summer school on lidar. Two students were supported to participate in a summer internship at West Virginia Wesleyan College.

- [WY] Funded 3 undergraduate internships in spring 2011. Two used Landsat images to study wildfire damage assessment and invasive species growth along the Powder River. The third student used MODIS images to monitor lodgepole pine sites impacted by bark beetle attack. These students presented their work at the Wyoming Undergraduate Research Day. The impacts included presentations at the Undergraduate Research Day have raised the awareness on remote sensing in the student's departments. Students shared their accomplishments with their advisors and other faculty members. This resulted in increased enrollment in the remote sensing courses on campus. Additionally, student internship testimonials and fact sheets served as valuable materials during their Congressional Outreach efforts.

  [WY] Awarded a graduate internship that used Landsat images to monitor the progression of beetle kill on Lodgepole pine stands in the Medicine Bow National Forest. The intern continues to work with Dr. Sivanpillai to prepare a conference proceedings abstract/paper describing the findings from this study.
  Impact: Graduate students have incorporated remote sensing in their thesis research work but the publication of research findings is largely influenced by their major advisors. A few have presented their research in local and regional conferences but we have not had a peer-reviewed publication yet.

(E-013) StateViews were engaged in five activities that developed training programs that addressed topical ideas tailored for specific state and discipline needs. These topical professional development programs were designed to meet specific critical needs of StateView partners and the broader community. Highlights follow.

[CA] Nine lab courses using ArcGIS have been developed for the certificate program focusing on CA wildfire issues.

- [HI] An undergraduate student in the Ka`imi`ike and C-MORE Scholars Programs at UH Manoa assisted with the Lacy Veach Day remote sensing/GIS event in October 2010 as part of the service learning requirement of her program.

- [IA] Offered undergraduate internships ($725 each) and half graduate research assistantships ($2010 each). The students will be given the opportunity to work with local and state government agencies to explore real word problems and how to solve the problems using remote sensing technology.
  Two undergraduate students were supported to conduct research. The first student worked on LiDAR data processing using high performance computing to make it available on the web. The second student focused on LiDAR data for precision-farming. They presented their research on various remote sensing conferences.
  One graduate student was supported through this funding and made one presentation and published two journal articles.

- [VA] VirginiaView is working with its K-12 and community college partners to develop and evaluate instructional activities based upon remotely sensed imagery and VirginiaView resources. Our work will develop local Virginia content to support the activities of the Integrated Geospatial Education & Technology Training targeted to provide geospatial instruction and training for community college instructors.

  Through this effort, 3 new certificate geospatial programs have been started and 11 community colleges are integrating geospatial technologies into courses for the first time. The first GTEVCCS cohort reported reaching an estimated 2,770 additional individuals in 2011. After seven-months into the academic year, 61% of participants reported that they integrated the knowledge and skills they learned from the VCCS 2010 summer institute as they had originally intended.

Activities Targeted Towards K-12 Programs (22 total activities)

(E-014) StateViews engaged in four activities that prepared and delivered guest lectures and demonstrations to highlight RS applications. These lectures provided an important outreach element to non-geospatial disciplines, informing the audience about the benefits of remote sensing in a variety of disciplines. Highlights follow.

- [CO] High school classroom lectures on Google Earth based remote sensing/GIS lectures and demonstrations were delivered by Dr. Jim Graham, two undergraduate interns, and one graduate intern working under Dr. Paul Evangelista. Resources have been directed toward other education related tasks which are a better fit for ColoradoView personnel.

- [GA] GaView participated in the Science Fair at the Bay Springs Middle School in Georgia on 2/24/2011 (6:00pm - 8:00pm). Three undergraduate students and one graduate student helped demonstrate remote sensing equipment and applications. They set up a working lab with a stereoscope with aerial photos, PSU Geospatial Revolution videos, Metro Atlanta urban growth with Landsat images, and the Okefenokee Swamp LiDAR project. More than 100 students and their parents visited their room.

- [KY] One faculty member from Morehead State University participated in a geospatial career day at the University of Kentucky as part of their NSF-sponsored ITEST Career

Day for participating K-12 students and teachers. There were 12 teachers in attendance and approximately 200 students.

- [WY] WyView PI gave a total of 8 talks in 3 Laramie area schools for the 2011 Earth Observation Day activities:
  1. Slade Elementary School - 6th graders - Feb 22, 2011 (1 talk)
  2. Laramie Junior High - 8th graders - April 5 and 6, 2011 (6 talks)
  3. Spring Creek Elementary School - 5th & 6th graders, May 9, 2011 (1 talk)

  Impact: K-12 teachers understand the value of remote sensing and how it can be incorporated in their classroom. After two attempts (over 2 years) we have fully integrated the remote sensing talk with the 8th grade physical sciences curriculum. We hope to make similar progress with other Laramie-area schools as well.

(E-015) StateViews were involved in six activities that developed workshops for students and teachers. Teacher workshops are an essential element of introducing remote sensing and related geospatial technologies into the classroom, and are often the first step in adopting these tools into the larger curriculum. Highlights follow.

- [GA] GaView hosted a two hour LiDAR workshop on 4/7/2011. P.R. Blackwell in TexasView helped the workshop with his Vidyo video-conferencing system. Participants are from University of Georgia, Gainesville State College, Virtial Geomatics Inc., S-Nelson & Associates Inc., Idaho State University, University of West Georgia, South Dakota State University, and University of Vermont. A total of 34 people participated (i.e. 3 company professionals, 6 faculty members and 25 undergraduate students).

- [HI] Na Pua Noeau (NPN) was held between June 12-25 2011. This event targets the local public and middle to high school students, especially Native Hawaiians. HawaiiView demonstrated the Science Kits we have been developing using some students at the NPN event. Additionally, HawaiiView contributed to Maui Economic Development Boards "Women in Technology" program. Dr. Gibson contributed a presentation to approximately 40 students from three Oahu schools at the Bishop Museum, Honolulu, in November 2010. The focus was on the use of remote sensing satellites in environmental science.

- [HI] HawaiiView conducted a remote sensing workshop at Astronaut Lacey Veach Day (October 16, 2010), which is for students grade 4 and up, and promotes science in honor of Hawaii-born NASA Astronaut Lacy Veach. HawaiiView presented at Punahou School, Honolulu. Dr. Barbara Gibson (HawaiiView outreach specialist) contributed a workshop entitled "The Mysterious Satellite GPS Challenge: use a hand-held GPS and top-secret evidence to follow hidden clues in order to discover the location of a very important satellite used to study environmental information about Earth.". The workshop was attended by approximately 50 participants (across two workshops). Attendees were a mixture of middle and high school students, and their parents.

- [MT] MontanaView presented a GIS and remote sensing education workshop in Libby, MT on October 12 – 13, 2010 (4 hour sessions both days) with 16 K-12 teachers which will impact approximately 550 students per year. MontanaView also hosted a remote sensing teacher institute titled "Principals of Remote Sensing" in Livingston, MT from June 27 – 30, 2011 (8-9 hours each day) for 8 K-12 teachers which will impact

approximately 270 students per year. The training used ArcGIS Image Analysis and MultiSpec software. As a result of the June 2011 training, two of the teachers enrolled for another geospatial instructional institute. Two other teachers paired together and received AeroCam images (through the Upper Midwest Aerospace Consortium) for use on their science float trip of the Missouri. In addition, a fifth teacher received two sets of AeroCam images for use on two student projects conducted by the Lewistown GPS Club.

- [PA] Dr. Mueller gathered material from Pictometry, a tutorial that Dr. Morgan (MDView) built and Pictometry labs created in the past and then created some test questions plus a set of objectives. The materials were tested in Dr. Mueller's GIS classes (80 students). Mueller presented his work at the Pictometry International Conference and took 10 students to the conference. These students worked the conference and two of them were interviewed for GIS positions. Two teachers used the lessons they developed last year in their classrooms (60 students). Pictometry has released a new education program and is hoping to give a presentation on it at a future AmericaView event.

- [WV] WVVIew leveraged its on-going NSF grant with the WVU college of education that supports geospatial science training of teachers. Fourteen teachers participated in the summer 2011 institute for the NSF-sponsored project (WV View provided leveraged financial support for the teachers to attend, and also provided support and equipment for the institute).

(E-016) StateViews were involved in one activity for groups such as 4-H, Boy/Girl Scouts, and other youth organizations. These “informal” education and outreach activities introduced groups to the power and excitement of geospatial technologies in ways that may not be possible in the classroom, for instance in an outdoor setting where students can practice and experiment. Highlights follow.

- [VA] VirginiaView leveraged funding from other sources to help in designed a geocoin to supplement existing geocaching activities. The geocoin and related activities will be distributed to middle / high school educational communities, as well as informal groups (4-H, scouting, etc.), to encourage geocaching and use of geospatial technologies in informal education. This effort will be coordinated with other StateViews to provide broader reach.

(E-018) StateViews were involved in two activities that supported state educational standards. Teachers are much more willing to adopt and implement educational resources that are closely tied to their state standards. Highlights follow.

- [CA] A listserv has been set up to include K-12 grade local science teachers. The listserv was used to provide RS activities and lesson plan updates.

- [HI] Infrared thermometers were added to the HawaiiView Science Kits, and a lesson plan (tied to Hawaii DoE Standards and Content) has been developed. The PI has been in contact with Diana Papini Warren (project manager, "Women in Technology" for the Maui Economic Development Board), and she is eager to help recruit teachers to test the educational kits. The kits are still in development. In addition, HawaiiView contributed to an online teacher workshop on how to use remote sensing in the classroom for the Women in Technology Geotech program (flyer attached in testimonial section, as is a

letter of thanks from the organizer). The workshop was held on October 19 2011, and 15 teachers from across Hawaii participated.

- HawaiiView contributed to another teacher workshop coordinated by Art Kimura as part of the Math Science Partnership.

- [NE] NebraskaView prepared materials for and participated in **Teacher's Night Out**, in Omaha (October 8, 2010) that attracted over 1200 K-12 teachers. The purpose of the evening event was to introduce teachers to resources that are available to them for supplementing and enhancing curriculum. NEView handed out over 150 Satellite View of NE posters, as well as Fact Sheets about the program.

(E-020) StateViews engaged in six activities to provide hands-on training for teachers -- so that they will incorporate remote sensing lesson plans in their classrooms. "Training the Trainer" is an important activity for AmericaView as we introduce the next generation to the capabilities of remote sensing, introduce the students to future career paths, and help to create and shape budding remote sensing scientists. Highlights follow.

- [CA] A 1-day teacher training workshop on Google Earth was conducted with 8 junior high school science teachers in conjunction with Earth Observation Day.

- [MD] Although unable to secure funding for a Summer 2011 SATELLITES program, MDView conducted a one-day Introduction to Digital Image Processing workshop in their new computer laboratory for a group of 32 secondary school teachers from the Baltimore metropolitan area. The workshop included instruction in the use of MultiSpec with Landsat data that had been clipped to the boundaries of the counties where workshop attendees taught.

- [ND] In April 2011, the NDView Director and a UND Geography M.S. student, made a 30-minute presentation about Landsat instruments and other forms of remote sensing to a group of 29 high school students and 1 in-service teacher. This was a subset of students competing at the North Dakota State Science and Engineering Fair in Grand Forks. Under the banner of Earth Observation Day and AmericaView, they made presentations about remote sensing on April 5, 2011, to 17 middle-school students, 1 in-service teacher, and 1 student teacher at Valley Middle School in Grand Forks; May 9 to 34 4th- to 8th-grade students and 3 in-service teachers at Binford, ND; May 10 to 16 5th- and 6th-grade students and 1 in-service teacher at Langdon, ND; May 19 to 14 5th-grade students, 4 in-service teachers, and 1 student teacher at Wilder Elementary School in Grand Forks, ND; May 20 to 14 7th- and 8th-grade students and 2 in-service teachers from Devils Lake, ND, who came to UND for the day, and June 30th to 20 1st- to 3rd-grade students, 15 4th- to 6th-grade students, and 1 in-service science teacher participating in a summer GPS and Mapping Camp at St. Michael's Catholic School in Grand Forks, ND.

- [OH] The SATELLITES (Students and Teachers Exploring Local Landscapes to Interpret the Earth from Space) teacher training on July 11-15, 2011 trained 25 teachers in inquiry based research. These 25 teachers will affect more than 800 students this year alone. The training they received will benefit thousands of students over their careers.

- [SD] A Geospatial Technology for Educators workshop was offered May 31 - June 3, 2011 for K-12 at the USGS National Center for EROS. See item C-13 for details.

- [VA] VirginiaView staff, accompanied by a K-12 teacher participated in the GeoMapApp, scheduled at California University of Pennsylvania, organized by PennsylvaniaView.

(E-021) Two StateView developed lesson plans for remote sensing or to incorporate remote sensing into other K-12 disciplines (Geography, Botany etc.). These lesson plans help students understand the broad application of remote sensing and related geospatial technologies. Highlights follow.

- [MD] Developed a land cover lesson (with Rick Landenberger and Tom Mueller) to be used for EO Day in April 2012. The lesson is based on a technique MDView described in their lesson to overlay Web Map Services data on Google Earth. The lesson uses the NLCD 2001 WMS data available for USGS's cumulus data portal.

- [SD] A Geography graduate student began the development of 4th grade standards-compliant Geography and History of SD curriculum materials as an independent study project, using the content of a currently used book as a guide. These materials include remotely sensed imagery and GIS map layers that are relevant to the material in the book. They are currently researching the best way to present the content within a GIS framework. Pilot testing in the classroom will be the next step, followed by refinements as identified by the classroom teachers. The project will hopefully be completed during the summer of 2012, and will eventually for available to all South Dakota 4th-grade teachers.

Increasing Awareness and Public Education (18 total activities)

(E-022) StateViews were involved in 11 activities to promote understanding of geospatial data among the public. The public is often overlooked as an audience for informal educational programs, but they are interested, and often have much to gain from educational offerings of various types. Highlights follow.

- [CA] A collaboration with a high school art teacher has been established to create a multimedia art project set-up in the Davis community presenting geospatial information. The project is still ongoing and consists of 18 high school students and 1 art teacher. The project will culminate with its Phase 1 in April of 2012.

- [ID] Idaho State University student Carol Moore gave a presentation about remote sensing and IdahoView at ISU's World GIS day. Currently, the IdahoView PI is working with the teachers and staff from University of Idaho's Moscow Outdoor Science School (MOSS) to engage them in Earth Observation Day activity in coordination with Tom Mueller and other StateViews. This is the first time and a major milestone for IdahoView in working with K-12 teachers. More importantly, IdahoView funded purchases of 5 laptop computers for MOSS to be used in remote sensing and geospatial training at the school both for students and teachers.

- [LA] LaView completed the development of data needs for Iberia Parish and placed a graduate student (now employed by the parish) in the position of GIS/RS coordinator for Iberia Parish.

- [MD] Maintained and updated the AmericaView Earth Observation Day Web site.

- [MT] A newsletter was produced with Remote Sensing and GIS links to related images, stories and map activities which relate to the use of geospatial technologies. This newsletter was distributed to 80 K-12th grade teachers across Montana for Earth Observation Day 2011.
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- [NE] NEView prepared and presented an exhibit for NaturePalooza at the NE State Museum (October 2, 2010). The event was well attended, with a total of 485 visitors (253 Adults, 194 Children, 26 UNL Students, 12 Friends of the State Museum).
  Geography Awareness Week at UNL (Nov 15-19, 2010) attracted over 80 participants (UNL undergraduate and graduate students) for the Geography Bowl. The photography contest had over 60 entries. The Central Nebraska Public Power & Irrigation District requested that they produce a Landsat poster of Lake McConaughy (the state's largest reservoir) showing its current (full) status. The false color IR poster of the lake contains a description of the Landsat satellite, as well as the sensors used and bands depicted. It was made with the intent that it would be displayed at the Kingsley Dam visitor center, but is on display at the Cabela's outdoor adventure store in Sidney, NE, where it is seen by a multitude of patrons daily.
  Weatherfest 2011 (April 9, 2011) - Distributed a large number of Satellite View of Nebraska posters and had an exhibit highlighting geospatial technologies. This event, part of the Central Plains Severe Weather Symposium attracted over 2000 attendees.
  Meadowlark Music Festival (June 11, 2011) - Participated in a UNL School of Natural Resources educational event and presented a display highlighting geospatial technologies. Inaugural event attracted about 30 attendees, 12 of whom were K-12 children.

- [NH] The NHView Director presented work on Loon Habitat in New Hampshire to a public audience called the Parish Helpers on April 14, 2011 in Wakefield, NH. Approximately 30 people were in attendance.

- [OH] Web stories, press releases, and fact sheets are being created, updated, and disseminated on a continual basis. These promote understanding of geospatial data among the public, and highlight the OhioView consortium's efforts, furthering their outreach mission.

  [PA] Dr. Mueller sent Earth Observation Day lessons to the teachers and recruited 2 teachers to participate in Earth Observation Day. Dr. Mueller purchased GPS units for 14 teachers (about 25 to 30 students per teacher) to assist them in their Earth Observation Day activities.

- [WI] WisconsinView participated in the Science Alliance Spring activity "Science Expeditions" (April 2, 2011) as in previous years. Approximately 150 individuals of the general public passed by the WisconsinView booth during a 6 hour period and learned about satellite remote sensing.

(E-023) One StateView participated in a museum display. Displays can be expensive and may require significant effort (and partnerships), but have the potential to reach a large number of people in an environment that is non-technical and conducive to learning. Highlights follow.

- [WI] In conjunction with the Cooperative Institute for Meteorological Satellite Studies at the Space Science & Engineering Center and Tandem Press, UW-Madison, WisconsinView participated in the planning, design, production, and installation of satellite imagery and related educational material at a major exhibit entitled "Satellites See Wisconsin" at the Dane County Regional Airport opening February 11 and running until Sept 10, 2011.
  WisconsinView began developing materials in November and December 2010 and January 2011 for the exhibit. The exhibit was a tremendous success. Press coverage was very positive and comments box comments also expressed enthusiasm. Hundreds of thousands of members of the general public passed through the airport and past the prominently positioned exhibit. Many stopped to study the exhibit.

(E-024) Two StateViews initiated mass mailings, distributed posters or other StateView products. These efforts increase awareness of remote sensing by the general public. Highlights follow.

- [KY] Promotional materials are currently under development, including a nearly complete draft of the new KyView brochure.

- [OH] OhioView postcards were mailed in association with promoting the AV FTM; our mailing piece is in progress and database work continues. Our database includes professors, legislators, teachers and private companies.

- **(E-025)** One StateView made presentations to service organizations. Service organizations may have much to gain from a presentation on remote sensing, and reaching community leaders is an effective way to increase our citizen's understanding of remote sensing imagery utilization. Highlights follow.

- [OH] An email database is being developed to send notifications to service clubs around the state that speakers are available from OhioView to present RS presentations. Robert Vincent (Bowling Green State University) speaks to Rotary International clubs throughout the state on a regular basis, and is deeply involved in their efforts to locate water well sites in third-world countries using LANDSAT TM data.

(E-026) StateViews engaged in three activities to display remote sensing imagery in public venues. Public venues have the potential to reach a very broad audience, many of whom may not know very much about remote sensing. Highlights follow.

- [CA] Remote Sensing imagery was used at the annual Science Olympiad in March 2011. Also, a high school art project has been initiated for April 2011 and a geospatial display was set up for the annual University Open House visited by 80,000 people.

- [GA] Dr. Seong developed two Landsat factsheets for USGS. The factsheets are available to the public and they will be used for the Science Night at the Bay Springs Middle School on 2/24/2011. He also printed/displayed a poster showing land cover change in the Atlanta Metro area using Landsat imagery. We plan on mailing it to our representatives in Capitol Hill during the 2012 WBM.

- [OH] Landsat as art images were collected for eventual posting on the OhioView web site.

D. RESEARCH ACTIVITIES (69 total activities)

Develop New Applications for Remote Sensing through Pilot Projects (31 total activities)

(R-001) StateViews were involved in eight collaborative activities with agency personnel or private companies to assess the utility and/or apply satellite data for monitoring and mapping activities that were not performed using imagery in the past. These activities expand the utilization of public remote sensing imagery such as Landsat. Highlights follow.

- [AL] Presented Coastal Mapping project at the Rocket City Geospatial Conference. Presented on OBIA classification of Saugahatchee watershed at 2011 AAG conference.

- [IA] As the result of an IowaView-supported internship, one student is closely working with John Deere and made two presentations at the national level conferences as a result of work.

- [KS] In June of this grant year KSView was successful in obtaining grant funding from the State GIS Policy Board to extend our flood inundation mapping efforts into central Kansas. This effort goes hand in hand with highly successful efforts by a consortium of GIS Policy Board members, led by Ingrid Landgraf, the USGS Geospatial Liaison to Kansas, to obtain significantly expanded LIDAR imagery coverage for the state. Digital elevation models derived from LIDAR are critical for producing high quality inundation extent databases. Work on this grant will begin in early 2012. In addition, a third round of funding was obtained from the Division of Water Resources of the Kansas Department of Agriculture for dam breach analysis in eastern Kansas. Work on rounds two and three are ongoing with plans to complete them in mid 2012.

- [MN] The University of Minnesota is actively involved with research on moderate resolution data, particularly Landsat, for mapping and monitoring land cover and water quality. Given declining state budgets, our proposals for continued updating of statewide land cover and lake clarity monitoring have not been funded. However, funding from a competitive grant from the University's Office of Vice President for Research, in collaboration with faculty from several other colleges and departments who are involved in geospatial research, will enable pursuing a good portion of the work and should result in new maps and data for the 2010-12 period over the next two years.
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- [MN] Following completion of a project with the Minnesota Pollution Control Agency to evaluate the potential of high resolution multitemporal - multispectral RapidEye imagery and hyperspectral imagery for assessing wetland quality, our high resolution image initiatives have concentrated on urban tree cover (and other land cover/use classes) mapping with a combination of QuickBird imagery, lidar data, and object-based image analysis for three cities, Minneapolis, St. Paul and Woodbury. The classifications were successfully completed and the cities are using the maps and data for management and planning.

- [MS] UMGC/MSView has been actively pursuing independent funding opportunities in collaboration with MSView partners as well as other research institutions. Examples are proposals to state agencies related to University and State disaster resiliency, NASA ROSES submissions, various NSF, DOE and NOAA opportunities.

- [NE] Worked with the Lower Elkhorn Natural Resources District to explore ways in which Landsat imagery could be used to certify irrigated acres (concluded that the resolution was not high enough for the level of accuracy required.)

- [PA] Dr. Mueller has been given the test site of Frick Park by the Pittsburgh Parks Conservancy and purchased high resolution images of the Park. Mueller will begin his analysis with the help of Pittsburgh Parks Conservancy this in FY11 and hopes to have the project completed by August 2012. This project has initiated a partnership between PAView and Pittsburgh Parks Conservancy which is responsible for many of the parks in Pittsburgh.

(R-002) StateViews coordinated seven research collaborations within their own StateView and between other StateViews. Coordination of research projects was critical to cooperative research and leveraged limited research funding. The synergy of the AmericaView and StateView Consortiums was utilized to strengthen the proposals and to make them more competitive. Highlights follow.

[AL] Worked with ArkansasView and VermontView to begin developing OBIA techniques and rule sets with Definiens. Attended very good workshop on GEOBIA at FTM. Sent JB Sharma a letter as a collaborator on the GEOBIA NSF proposal. Proposal was not funded. There has been some talk with JB Sharma about eCognition training amongst GeorgiaView and AlabamaView.

- [GA] J.B. Sharma collaborated with Jarlath O'Neil Dunne and Austin Troy of the University of Vermont to submit a GEOBIA grant to NSF in Jan 2011. The proposal was for a GEOBIA education-research-training facility. There was a lot of support from AV for this grant and if funded it would have brought a lot of resources to the AV consortium. Even though it was not funded, the collaboration among multiple StateViews has brought significant synergistic effects.

- [KS] Small grants (~ $500 each) were made to KansasView member universities to encourage remote sensing research specifically focused on issues related to Kansas.

- [KS] As outlined in their revised annual plan, Kevin Dobbs led a very successful visit to the USGS EROS Data Center in April 2011. (This was done in lieu of separate grants to individual schools). The trip included a tour of facilities and presentations by EDC scientists, as well as the opportunity to give a presentation on our floodplain and dam break analysis.

- [KY] Two applied research mini-grants of approximately $3,500 each were awarded to member faculty and staff during the grant period. The projects were entitled "A focused accuracy assessment of the 2006 National Land Cover Data in Kentucky" (which included a male undergraduate student research assistant) and "Generation of evapotranspiration maps for western Kentucky using Landsat satellite imagery".

- [VA] VirginiaView drafted a white paper to document the rationale and motivations, identify research and funding themes, and explore collaborative opportunities related to the science and applications of synthetic aperture radar. The paper identifies thirteen individuals as potential interdisciplinary research team members. Effort is underway to identify potential sponsors and to further develop themes identified in the white paper.

- The ChesapeakeView collaborative continued to be a very successful multi-StateView initiative (including PennsylvaniaView, West VirginiaView, VirginiaView and MarylandView), which maintained a portal to multistate Chesapeake Bay holdings. The website can be accessed at: http://www.chesapeakeview.psu.edu/

(R-003) StateViews were involved in four activities designed to develop innovative uses for moderate-resolution satellite imagery. These projects effectively extended the range of applications of Landsat data, and fostered partnerships within and between state partners. Highlights follow.

- [AL] Funded a graduate student to map algae concentration as an indicator of Lake eutrophication in Lake Martin, Alabama. He used field spectroradiometer data that match Landsat channels that will be used to estimate Chlorophyll-a levels for the Lake. We found a relationship between Chloropyll-a and algae levels and the reflectance in the channels matching band 3 on Landsat 5. Will assist in creating surface estimates of algae concentration with Landsat 5 data.

- [MN] Acquired MERIS data that has proven to be an excellent source of data for monitoring lake water chlorophyll. Its 300-meter spatial resolution is sufficient for many lakes, and it has an excellent set of spectral bands for water quality assessment, wide swath width and frequent data acquisition. Analysis of MODIS data for monitoring vegetation condition and dynamics is on-hold, awaiting funding.

- [SD] Flooding along the Missouri River was a major event in South Dakota during the summer of 2011. SDView prepared a poster showing a comparison of 2004 and 2011 water levels in the Pierre area for display at a major agricultural exposition in Mitchell, SD, called DakotaFest. Change detection algorithms were used in conjunction with Landsat imagery to highlight the areas along the Missouri River that were covered by water in 2011, but not in 2004, a year of historic low water levels.

- [WY] Continued to work with WyView consortium members to find innovative uses for Landsat and ASTER data, especially in the monitoring arena.
  This work was completed by WyView interns under the supervision of Dr. Sivanpillai.
  - ❖ Used Landsat images for assessing wildfire damage. We evaluated the trade-off of using non-anniversary Landsat images (immediately prior to- and after the-fire) for assessing fire damage.
  - ❖ Used a Landsat image to characterize the spectral differences in Salt cedar stands along the Powder River Basin.
  - ❖ Used 6 years of Landsat images (1 image/year) to monitor the impact of beetle attack on Lodgepole pine stands in the Medicine Bow National Forest.

  These projects were identified as a priority by WyView consortium members.
  Impact: By working with student interns we are able to address more questions that are priorities provided by land management agencies. Students often want to work with a

'real-world' problem and agencies provide their expertise (feedback) and certain cases field data. Thus we are able to make progress on several fronts.

(R-004) StateViews were involved in five activities related to development of software to support the distribution of satellite, airborne, and other geospatial data. These projects helped to get data into the hands of partners and the public. Highlights follow.

- [AK] AlaskaView's previous year's efforts at creating easy to deploy web application portals for targeted datasets came together in what is called GitHub. AlaskaView continues development on Hub and is looking to integrate this simple to deploy and easy to manage web based GIS application portal into the AmericaView multi-state-server project as one of the many interfaces to access the data that will be deployed there.

  AKView also created a new library for web map developers that allows users to quickly integrate AlaskaView's tile layers into online mapping applications that use Google, Bing, ArcGIS and OpenLayers maps. http://github.com/gina-alaska/gina-map-layers

- [AR] ArkansasView initiated work on the development of server-based collaborative geoprocessing tools that can be used in various remote sensing activities ranging from Earth's forests to planetary data analysis. Funds were used to purchase a portion of the miscellaneous components of a test server as well as part of the time required to configure virtualization and server-based data processing software. As of September 2011, the server was configured with 1) An Adaptec RAID 6405 card was added to the server allowing flexible SAS connectivity at 6 Gbps speeds, 2) two network adapters, 3) Windows Server 2008 R2, 4) ArcGIS 10 Desktop, and 5) ArcGIS 10 Server. The team noted that multiple RAID arrays allowed for an efficient utilization of the four 2 TB hard drives, with the first array (256 GB) set aside for software and the second array (3.4 TB) set aside for remote sensor, ancillary, and *in situ* data.

- [IN] A new version of MultiSpec was released on December 15, 2010. One can now use the Echo Classifier in MultiSpec to analyze images with more than 250 million pixels. This work was started during the FY09 period in response to some needs by a researcher with the U.S. Fish and Wildlife Service. Testing and release occurred during FY10. Another new version was released on July 28, 2011. This version provides the ability to handle ECW (enhanced compression wavelet) and GRID (Gridded Binary) formatted image files. The ability to define class names, colors and group assignments with a text based input file was also added using the ArcView type .clr files. More info is at: https://engineering.purdue.edu/~biehl/MultiSpec/new.html.
  The tasks for handling compressed GeoTIFF images and the ability to combine Landsat bands automatically was delayed because of changes in priority.

- [WI] WisconsinView continued to develop capabilities in conjunction with other projects. A related NASA grant purchased two servers (costing $10K each) that will host a robust WMS system that WisconsinView will be able to use for product generation.
  They made progress in bringing high resolution aerial photography to mobile devices and web browsers using Google Maps. Below is a link to an example of 2010 statewide 18" imagery available for streaming or download only through WisconsinView:
  http://www.wisconsinview.org/imagery/wroc_preview.php

(R-005) StateViews were involved in three activities that posted methodologies or tools for other StateViews to use or test. These efforts reduced duplication, saved limited funding resources, and resulted in higher productivity by AV consortium members. Highlights follow.

- [ID] The Idahoview webpage and Idaho lidar consortium webpage have gone through major restructuring. The main changes on their webpages include freely downloadable lidar processing toolkits, lidar research manuscripts, and news pieces about major remote sensing research and educational projects going on around the state. Both webpages are continually updated and maintained.

- [MI MichiganView continued to host and administer the AmericaView wiki (http://wiki.americaview.org) as a resource for sharing tools and will continue to support its usage through examples and training.
  MichiganView maintained the AmericaView blog (http://blog.americaview.org/) to host articles written by AmericaView members.

Develop Research Opportunities for Students (27total activities)

(R-007) StateViews were involved in four activities that provided students with scholarships or stipends to promote remote sensing research and promoted participation of under- represented groups, including women, ethnic minorities, and first generation college students. These activities effectively advanced the nation's need to support minority participation in STEM education fields. Highlights follow.

- [KY] One undergraduate workship was provided each semester of the grant period. The female student assisted with basic mapping activities, as well as with uploading Landsat imagery browse jpegs for Kentucky for the past few decades to the KyView website. Also, a remote sensing book award was made to an outstanding female graduating senior.

- [ND] Provided four $500 scholarships to students interested in learning more about remote sensing and/or using remotely sensed data in their research.
  Four scholarships were awarded. The 2010-2011 winners were an M.S. student in the UND Department of Geography; Two M.S. students in the UND Department of Biology; An M.S. student in the UND Department of Space Studies. There were 2 other applicants that were not awarded scholarships. A panel of 3 UND faculty members with expertise in GIS/RS reviewed the proposals (the NDView PI was not on the panel).

- [WV] Research support was provided to a female undergraduate in order to present her undergraduate research at a major regional conference. See E-012.

- [WY] Every year WyView offers 5 undergraduate and 1 or 2 graduate scholarships or internships to UW students. For the past several years we were able to fund several women and first generation college students. This year we will actively promote our program to recruit more ethnic minorities, especially Native Americans, students.

Impact: Students are often excited to work on real-world problems that are also aligned with their interest (mapping wildfires, invasive species, land cover changes). With the limited time, the WyView PI is able to make progress on several priorities identified by our consortium members.

(R-008) Seven StateViews were active in promoting the use of StateView archived data in student research projects (term projects), where students would not have had such an opportunity for use in the absence of free data. These projects made available an applied educational opportunity that would not otherwise be recognized. Highlights follow.

- [GA] A UWG undergraduate student used GEOBIA research with GaView data and software. He even used the tutorials from another GaView member institution - Gainesville State College. Without GaView, this research would not have been possible. Two LiDAR datasets, two aerial photos, one Landsat satellite image, and one DEM were used with eCognition.

  [LA] Utilized Hurricane and BP Oil Spill data as part of a course in environmental hazards and emergency response in its GIS/RS curriculum.

- [MT] Fall 2010: Presented and made MontanaView data and imagery available to the university students at MSU in the LRES 426 Remote Sensing and Digital Image Processing (20 students) and 525 Applied Remote Sensing course (6 students). Presented and made MTView data and imagery available to students at U of MT in Geog 487 & its lab 489 Raster GIS & Remote Sensing (24 students).
  Presented and made MTView data and imagery available to students at Montana Tech of The University of Montana in Geop 491/495 Remote Sensing and GIS Applications (5 students and 1 faculty). Spring 2011: Presented and made MontanaView data and imagery available to the university students at MSU in the LRES 429/525 Applied Remote Sensing course (5 students). Presented and made MTView data and imagery available to students at U of MT in GPHY 587/9 (15 students).

- [NE] NEView assisted UNL Natural Resources undergraduate student with her project mapping deuterium isotope ratios in feathers of North American raptors.

- [WV] Students in Geog /Geol 755 at WVU used the West Virginia View archived data in their term projects. The archive was also highlighted as a resource for teachers participating in the summer NSF-sponsored institute.

- [WI] WisconsinView receives and accommodates occasional requests from students for assistance with imagery use or acquisition. Many requests result in a hands-on tutorial of USGS GloVis.

- [WY] WyView data have been used in more than 125 class projects in 4 remote sensing and 2 GIS/spatial sciences courses in UW over the WyView project's history. Students find it easier to use WyView data because they are available in ready-to-use format (ERDAS Imagine or GeoTIFF). UW researchers check our archive first and only download those scenes that are not available.
  Impact: Same as D-001.

(R-009) StateViews engaged in six activities to support student publications or presentations in university or other forums. The publications and presentations significantly strengthened the student's abilities and provided them with valuable resume-building experiences. Highlights follow.

- [GA] A student research project was presented at the 2011 Big Night event at UWG (4/1/2011). GeorgiaView helped an undergraduate student, to research and present "Identification of Tree Crowns through Object-based Image Analysis."

- [KY] Helped sponsor a student poster session at Morehead State University in May 2011. Approximately 20 undergraduate students presented their research posters to faculty, staff and other students.

- [ND] GRAs and students receiving scholarships or otherwise involved with NDView were encouraged to present their research at some type of scholarly forum as either a poster or oral presentation:

  A UND Geography Master's student and Dr. Brad Rundquist (NDView PI) presented "Object-Based Land Cover Mapping of Eastern North Dakota Breeding Bird Survey Routes" at the annual meeting of the Association of American Geographers in Seattle, WA. That research was funded by NDView.

  A UND Geography Master's student, a UND Geography undergraduate student, and Dr. Brad Rundquist (NDView PI) presented "Object-Based Land Cover Mapping of Eastern North Dakota Bird Survey Routes using High-Resolution LiDAR and Multispectral Aerial Imagery" at the annual meeting of the Great Plains/Rocky Mountain Division of the Association of American Geographers in Lawrence, KS. That research was funded by NDView.

  A UND Biology Master's student, Ms. Cami Dixon (U.S. Fish and Wildlife Service), Dr. Brad Rundquist (NDView PI), Dr. Brett Goodwin (UND Biology), Dr. Katherine Yurkoni, (UND Biology), Katherine Mehl (UND Biology) and M.A. Ahlering (The Nature Conservancy) presented "The Influence of the Surrounding Landscape on Grassland Songbird Diversity in the Devils Lake and Arrowwood Wetland Management Districts of North Dakota" at the annual meeting of the North Dakota Chapter of The Wildlife Society in Minot, ND. That research was partially funded by NDView.

- [OH] 90 students presented their research at the OhioView spring conference on April 12, 2011. Awards were grouped by age (K-6, 7-9, 10-12, and University). The top 3 in each group were awarded trophies. The top 3 university presenters received monetary prizes.

- [WV] One male graduate student, whose work was supported by West Virginia View, has had his research paper accepted by Photogrammetric Engineering and Remote Sensing. One female undergraduate received support to present her undergraduate research (also sponsored by West Virginia View) at a conference. See E-012.

- [WY] Three WyomingView undergraduate interns presented their research in the Wyoming Undergraduate Research Day on April 30, 2011. Photos from this are uploaded in WyView's Facebook page: (http://www.facebook.com/pages/WyomingView/314286598583916 - photos section)

and testimonials will be uploaded in WyView's webpage (http://sunlight.wygisc.uwyo.edu/wyview/scholarships.html).
Impact: More faculty members on campus have a positive view of remote sensing instead of viewing it as a tool to make maps. Work conducted by WyView interns have helped us to showcase the value of remotely sensed data for monitoring and mapping various land cover features in Wyoming.

(R-010) Two StateViews promoted research competitions among member institutions within their consortia. This competition offered an opportunity for faculty and students to share and extend their work.

- [IN] Provided the funds to support one mini-grant for this funding period. We feel that it is important to support this task to involve other partners in the IndianaView consortium. A mini-grant titled "Archiving and Distributing Indiana Historic Sanborn Maps", was selected in April. The project, completed in September, makes Indiana Sanborn 1883-1966 Historic Maps available to the public in both TIFF and PDF formats (http://www.indiana.edu/~gisdata/sanborn.html). This is project is best characterized as a ground reference data set for remote sensing. Founded in 1867, the Sanborn Map Company was the primary American publisher of fire insurance maps for nearly 100 years. The Fire Insurance Maps aided insurance agents in estimating fire insurance liabilities in urban areas. The maps provide a detailed account of urban development and change in communities during the early twentieth century. Sanborn maps are large-scale (1:600) and depict street layouts, building footprints, building materials, utility lines, street names, street and sidewalk widths, property boundaries, building use, and house and block numbers. A message about the completed project was made available on the AmericaView blog (http://blog.americaview.org/).

- [OH] Awarded monetary prizes to the best graduate student papers at the SATELLITES/OhioView Conference.

(R-012) AmericaView Principal Investigators served on more than 113 M.S. and Ph.D. committees or otherwise advised students to guide and encourage the use of remote sensing. Serving on committees is required of most research-oriented faculty, but AV funding helped to support this work both directly and indirectly. Unless otherwise noted, the supported projects all involved geospatial science and technology tools and applications. Highlights follow.

- [AL] Served as Major advisor to 7 graduate students (1 completed M.S. in 2010, 2 completed in 2011) and on 10 committees (in which two completed in 2010).

- [AR] Dr. Tullis served on 15 Masters / PhD committees with a remote sensing component.

- [ID] Sankey, Gessler, and Glenn have been and will continue to advise graduate students in the use and application of remote sensing methodologies. Numerous refereed publications have been generated by our graduate students. Both the student and faculty projects are continually posted on Idahoview webpage and Idaho lidar consortium webpage as news pieces. In addition, all of our research publications are listed and freely downloadable from the Idaho lidar consortium webpage.

- [MT]
  Rick Lawrence served as major advisor for 5 MS graduate students, 3 PhD graduate students, and served on 6 other remote sensing related committees. Three of his students relied on data provided by MontanaView and the results of their research have been published in peer-reviewed journals. Anna Klene served as major advisor for 21 MS graduate students and 4 PhD graduate student. She also served on 6 other MS graduate student committees and 5 PhD graduate students committees.

- [ND] In FY10, Dr. Rundquist sat on the committees of 1 completed Ph.D. project in Animal and Range Science at North Dakota State University that made use of remote sensing, an M.S. project in Geology at UND that used GIS, an M.S. project in Geography at UND that used GIS and remote sensing, and an M.S. project in Biology at UND that used GIS and remote sensing. He currently advises 5 M.S. students in Geography who are using remote sensing to address environmental questions and serves on another 7 Ph.D. committees (Biology, Earth System Science and Policy, Criminal Justice, Communications, and Geology) and 9 M.S. committees (Biology, Geography, Biology, Geological Engineering, and Space Studies).

- [OH] Most of OhioView's PIs served on MS or PhD committees and encouraged use of RS approaches. They also utilized software purchased by the consortium. OhioView member PIs served on 15 masters and/or PhD committees during this timeframe.

- [WV] The WV View PI served on 10 PhD committees, and two MA committees.

- [WY] Dr. Sivanpillai is serving on the committees of five UW graduate students and is providing technical support to their research involving remote sensing science and technology.

(R-013) Two StateViews developed innovative ways to generate and deliver deliver data. These methods can save time, effort, and computer resources, and increase the efficiency of various types of remote sensing analyses. Highlights follow.

- [MI] Worked to create a real-time KML file that will display current satellite locations and sensor footprints in Google Earth. The satellite tracking app has been moved to a more permanent url: http://apps.michiganview.org/satellite-tracking. During the second half of the year we planned to add sensor footprints to the realtime KML (for viewing in Google Earth), however, development was slower than anticipated. An intern was brought on to assist with the work but, unfortunately, extensive training was required to bring him up to speed on our current practices. He has currently developed new functionality for the app including the ability to cache ephemeris data and request new data on demand. Going forward, he will reproduce the current site's functionality in light of these improvements and begin to develop new functionality such as swath display.

- [PA] Worked on developing and testing an inexpensive aerial data gathering system utilizing kites and commercially available components for the purpose of aerial terrestrial and marine studies. In contrast to previous work done with unmanned aerial vehicle (UAV) platforms, this project develoedp a much lower cost system that is more deployable due to being subjected to reduced FAA regulations. Dr. Mueller is

attempting to use the data from the project to "check" the accuracy of Landsat pixels using sub pixel classification.

Using StateView Resources for Leveraging (4 total activities)

(R-15) One StateView leveraged the StateView coordinator's salary and or data archive as a matching cost while submitting grant proposals. The value of StateView networks added to the probability that competitive funding was awarded.

- [IA] IowaView members used the IowaView data archive as matching costs for research proposals.

  Funded proposals:
  1. Principal Investigator, Integrating LiDAR and watershed management software, USGS- Iowa Water Center and UNI, 08/2011 – 02/2013, $156,000 (includes soft and hard match).
  2. Collaborator. Investigating spatial relationship between adult obesity and the built and natural environment, 02/2011 – 12/2011, UNI, $15,000.
  3. Principal Investigator, Harnessing cloud computing for processing massive spatial data, Amazon Research Grant, 08/2010 – 07/2012.
  4. Co-Principal Investigator. Smart Phone App for Cedar Falls Historical Sites learning using Augmented Reality, 08/2011 – 06/2012, UNI, $5,067.
  5. Principal Investigator, Cloud computing for LiDAR data, Microsoft Research, 08/2010 – 02/2012.
  6. Principal Investigator, Interdisciplinary Research Experience in Hyperspectral Imaging (IDREHSI). National Science Foundation (NSF), 01/2012 – 12/2014, $344,848.

  Proposals submitted:
  1. Principal Investigator, NASA EPSCoR- RID-Augmentation, NASA10/2011 – 08/2012, $50,000.
  2. Principal Investigator, Interdisciplinary Research Experience in Hyperspectral Imaging (IDREHSI). National Science Foundation (NSF), 01/2012 – 12/2014, $344,848.
  3. Principal Investigator, International: A US-Brazil collaborative investigation of floods and landslides in urbanized watersheds using advanced geospatial techniques and technologies. National Science Foundation (NSF), 08/2011 – 02/2014, $149,793.
  4. Co-Principal Investigator Taimyr Reindeer and Environmental Change (TREC): Modeling Spatiotemporal Dynamics of Taimyr Wild Reindeer Population in a Changing Environment, National Science Foundation (NSF), 08/2012 – 07/2015, $258,619.

(R-016) StateViews engaged in four activities that promoted the value of their consortium to attract research funding. The value of StateView networks added to the probability that competitive funding was awarded. Highlights follow.

- [ID] IdahoView was used as a supporting resource for successful proposals to both the NSF EPSCOR program and the USDA CAP program. It is also listed as a supporting resource for a new USGS funded climate center. Each of these initiatives

are large regional collaborations and IdahoView has been viewed as a supporting resource that has contributed to grant success.

- [NH] We were part of the team that created the activities for EOD. Also, we were part of the team from AmericaView that submitted an education proposal to NOAA to promote geospatial learning. Finally, we have begun discussions at the University of New Hampshire on a Graduate Certificate in Geospatial Technologies and have submitted a proposal to the Provost for some funds to explore this idea. This proposal was funded for the July 1, 2011- June 31, 2012 time frame.

- [TX] TexasView Coordinator Rebecca Dodge and Data Coordinator Teresa Howard met with outreach personnel from the Texas Department of Parks and Wildlife (TDPW) in August to introduce them to the TexasView EODay web site and explore interest in further collaboration. As a result of this meeting, additional TDPW data and links were added to the EODay site. The site was well received at TDPW and plans were discussed for TDPW to promote use of the resource.

  A NSF Cyber Infrastructure REDDnet related proposal was submitted during this performance period. If funded, this proposal would have funded development of a WMS front end for REDDnet storage resources.

- [WV] West Virginia View was offered as an archive location for a lidar acquisition and analysis grant submitted to a local resource company.

Publication of Results in Peer-Reviewed Journals (4 total activities)

(R-017) StateViews engaged in four activities related to submitting and/or publishing their AV-funded research results in peer-reviewed journals. These publications assist in advancing remote sensing analysis, applications, and the usage of public and emerging remote sensing imagery. Highlights follow.

- [AL] Much of PI's time for AV summer salary is devoted to research and publishing with students.

  1. Bhattarai, N. M.P Dougherty, L.J. Marzen, L Kalin. (In press) Validation of a modified surface energy balance algorithm model for land (SEBAL) in the south-eastern United States. Remote Sensing Letters. 3:6, 511-519.
  2. Marzen, L.J., *Z. Szantoi , L.M.B. Harrington, and J.H. Harrington. 2011. Implications of Management Strategies and Vegetation Change in the Mount St. Helens Blast Zone. Geocarto International. 26:5, 359-376.
  3. Lee, M-K., M. Simon, K. Fielman, L. Marzen, Y. Lin, M. Wooten. (in press) Bringing Global Climate Change Education to Alabama Classrooms. In Handbook of Climate Change Mitigation, (eds.) Chen, W.-Y.; Seiner, J.; Suzuki, T.; Lackner, M. Springer: ISBN 978-1-4419-7992
  4. N. Dhakal, X. Fang, T. Cleveland, D. Thompson, W. Asquith, and L.J. Marzen. 2011. Estimation of Volumetric Runoff Coefficients for Texas Watersheds Using Land-Use and Rainfall-Runoff Data. Journal of Irrigation and Drainage Engineering. doi:10.1061/(ASCE)IR.1943-4774.0000368
  5. *de Villiers, G., D.T. King, Jr., and L.J. Marzen, 2010. Remote sensing of shallow-marine impact craters on Mars: Meteoritics and Planetary Science. 45(6): 947-964.

6. *Styers, D.M., A.H. Chappelka, L.J. Marzen and G.L. Somers. 2010. Scale matters: Indicators of ecological health along the urban-rural interface near Columbus, Georgia. Ecological Indicators. 10: 224-233.

[AR] Dr. Tullis coauthored papers titled "Spatial Scale Management Experiments Using Optical Aerial Imagery and LIDAR Data Synergy", published in *GIScience and Remote Sensing* (Sep 2010), and "Spectral Identification of Previsual Northern Red Oak (*Quercus rubra* L.) Foliar Symptoms Related to Oak Decline and Red Oak Borer (Coleoptera: Cerambycidae) Attack", published in the *Southern Journal of Applied Forestry* (Jan 2011).

[NC] Articles published and partially supported by the USGS/AV grant to East Carolina University:

Guangcai Sun, Mengdao Xing, **Yong Wang**, Yufeng Wu, Yirong Wu and Zheng Bao, 2011. Sliding spotlight and TOPS SAR data processing without subaperture. *IEEE Geoscience and Remote Sensing Letters*. 8(6), 1036-1040. DOI: 10.1109/LGRS.2011.2151174.

Peng Zhou, Mengdao Xing, Tao Xiong, **Yong Wang** and Lei Zhang, 2011. A variable-decoupling- and MSR-based imaging algorithm for a SAR of curvilinear orbit. *IEEE Geoscience and Remote Sensing Letters*. 8(6), 1145-1149. DOI: 10.1109/LGRS.2011.2158387.

Guangcai Sun, Mengdao Xing, **Yong Wang**, Yan Liu, Yirong Wu and Zheng Bao, 2011. A new signal model for a wideband synthetic aperture imaging sensor. *Canadian Journal of Remote Sensing*. 37(2), 171-183. DOI: 10.5589/m11-033.

APPENDIX 2 Removed – For Internal Government Use Only

APPENDIX 3 - StateView Activity Emphasis for grant year FY10

Program Area Key
C= Consortium Development
D= Data Delivery
E= Education
R= Research

A **bold** letter indicates that the state proposed more than five activities in the Program Area, regular font indicates that 1-4 activities were proposed. A dash represents zero activities.

State	Activity Types
Alabama	C **D** - **R**
Alaska	C **D** E R
Arkansas	C D E R
California	**C** D **E** R
Colorado	C D E R
Georgia	**C** D **E** R
Hawaii	- D E -
Idaho	**C D E** R
Indiana	C **D** E R
Iowa	C D E R
Kansas	C D - R
Kentucky	C - E R
Louisiana	**C** D E R
Maryland	**C D E** -
Michigan	C D E R
Minnesota	C D E R
Mississippi	C D E R
Montana	C D E R
Nebraska	**C D E** R
New Hampshire	**C** D E R
North Carolina	**C** D - R
North Dakota	C **D** E R
Ohio	**C D E R**
Pennsylvania	**C** D **E** R
South Dakota	C D **E** R
Texas	C D E R
Virginia	C D E R
West Virginia	**C D E R**
Wisconsin	C **D** E R
Wyoming	C **D** E **R**

NATIONAL CONSORTIUM FOR REMOTE SENSING EDUCATION, RESEARCH, AND APPLICATIONS

WyomingView
PROJECT FACT SHEET

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Increased Landsat data usage in the Ag remote sensing class (2009-11)

Principal Investigator Ramesh Sivanpillai, University of Wyoming (E-Mail: sivan@uwyo.edu)

Remote sensing of agricultural resources: UW students enrolled in the Applied Remote Sensing for Agricultural Management course (taught every fall) have used Landsat images for monitoring and mapping agricultural and natural resources.

Students enrolled in this class came from several states across the US. Students used these images to monitor crop growth, assess forage availability in ranches, monitor vegetation response over time, map forest conditions and wildfire impacts, and analyze changes in lake surface areas in these states.

No-cost data from USGS Landsat data archive: Starting December 2008, the US Geological Survey (USGS) began providing the entire global Landsat collection for NO-COST. As a result both the number of Landsat images used (figure 1) and the states studied have increased (figure 2).

While increased enrollment in this course is responsible for the upward trend, the average usage as measured by the ***number of scenes per student*** has also increased from **2 (2009)** to **6 (2011).**

Ability to obtain images acquired at specific seasons (*e.g.*, early spring or late summer), and years (e.g., drought, wet and normal years) resulted in more seasonal and multi-year studies. Working on a project of their choosing with appropriate images enhanced student's learning experience.

Student testimonials:

"*I will be graduating soon and looking at the various Landsat images over 30 years gave me insight into the value of the farm and the production it is capable of. In the past this project would not have been possible due to the high price of Landsat images.*" – **Mr. Christopher Heil, BS Agroecology (Class of 2009)**.

"*I found this class to be very interesting. I used the skills I learned to compare vegetation growth on grazing allotments that are in different management catagories. I think that this technology can have a great effect on the way that we gather information and manage areas of land.*" – **Mr. Clint Beiermann, BS Rangeland Ecology & Watershed Mgt. (Class of 2010)**

"*In using Landsat 5 to look at alfalfa fields, I learned that there are many valuable tools to use to analyze the imagery. You can use these tools to help determine what management practices are working and areas that need more work.*" – **Ms. Katie Nelson, BS Rangeland Ecology & Watershed Mgt. (Class of 2011)**

http://www.uwyo.edu/wyview/

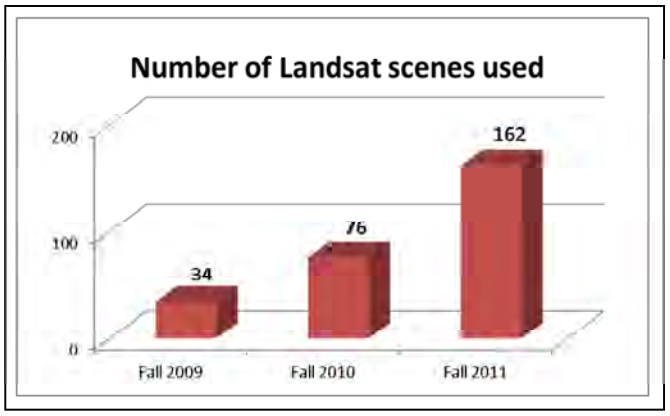

Figure 1: Landsat usage for class projects since 2009.

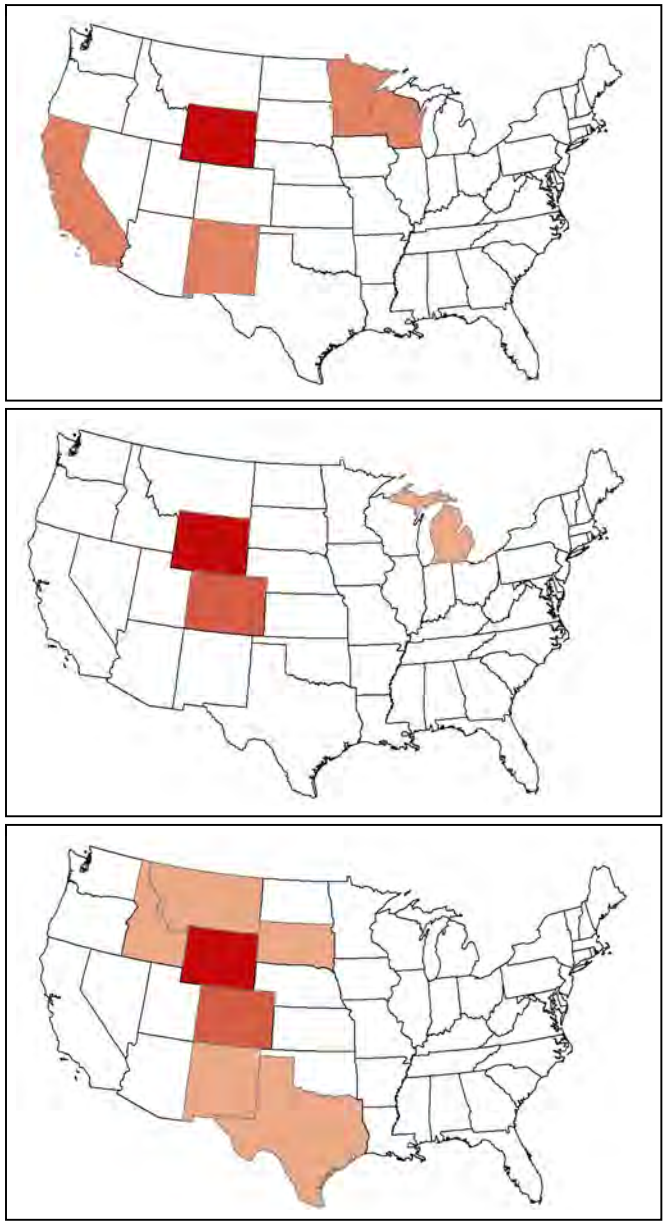

Figure 2: Location of study sites in '09 (top),'10 (middle), and '11(bottom)